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January 17, 1938

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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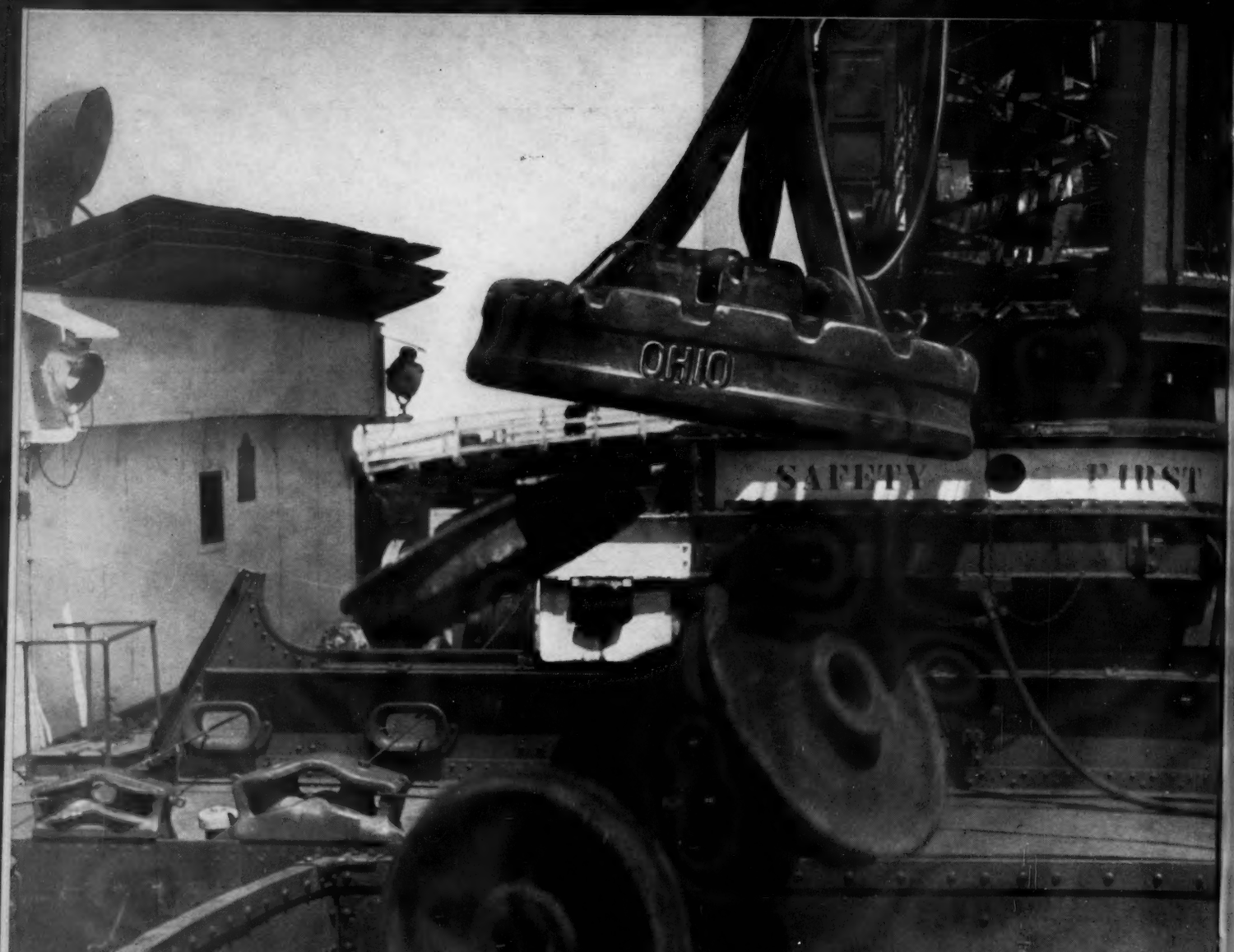

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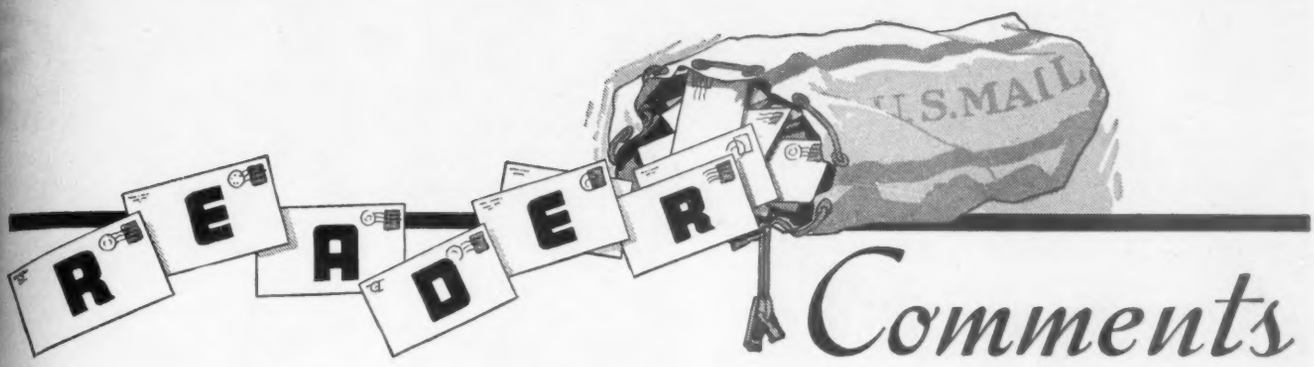

Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Appreciate the Yearbook

(EDITOR'S NOTE)—Scores of letters of appreciation for the Jan. 3, annual yearbook issue of STEEL, have been received, excerpts from some of which follow:

To the Editor:

The whole volume is one magnificent piece of work, editorially, advertisingly and in the selling job you have done; and the press and binding and mechanical work I am sure has never been surpassed in the trade publication field. Its editorial contents, with their convenient arrangement, would seem to assure this issue of STEEL a whole twelve-month of usefulness.

A. D. WALTER

A. D. Walter Inc., Pittsburgh.

I would say that this issue is the best one which you have ever put out; and I have heard the same comments from others in our organization who have examined this particular issue.

F. H. BARNARD

Morgan Engineering Co., Alliance, O.

I enjoyed very much reading your annual issue. It certainly is a splendid piece of work and carries some very interesting articles.

RAY SEABURY

Secretary, Drop Forging Association, Cleveland.

I wish to congratulate you and your associates on the excellence of the format, as well as the contents, of the 1938 "Yearbook of Industry" issue of STEEL.

An almost endless amount of care and patience is required in this selection and then the accurate compilation of the statistical data which you have presented, referred to no doubt by many during the year.

W. G. HILDEBRAN

Assistant Secretary, Wellman Engineering Co., Cleveland.

Industry Must Speak Out

To the Editor:

I do not know whether anyone took time off to congratulate you on the editorial on page 33 in the Jan. 10 issue of STEEL, but it seems to me the article is timely. Why in the world doesn't industry through its regular mouthpiece of trade, advertising, begin to correct the incorrect impressions and miscomprehensions as well that seem to abound?

Go into any home of an evening and you will meet someone who seems to have a fanatic zeal for the Rooseveltian idea of hitting big business or even ordinary business!

If you take the side of the business interests you are immediately accused of being out of harmony with the progressive idea of social progress. It isn't that at all—it is simply that those who are against business only think they are because they hear only one side.

What of industry's contribution to general wealth, its share of the tax burdens, its capital expenditures, its wage record, its employment progress record, the increase in average employe's living standards, its production record, and so on, to show what industry has really done—the only force that really put America where it is—or where it was up to now!

Keep the good work up—keep driving on this point.

WILLIAM COHEN

State Theater Building, Pittsburgh.

Training Executives

To the Editor:

Publication in STEEL of an article on the Joslyn employer-employe plan, original with the Chicago manufacturer, (STEEL, Nov. 15, page 23) leads me to give some description of the remarkable management experiment started by McCormick & Co. Inc., Baltimore, spices, teas, extracts, insecticides, etc., since adopted by other firms. It might interest some metalworking firms.

Charles P. McCormick, who was elected president five years ago, was of the opinion that outmoded management ideas were retarding the progress of the firm and decided to do something about them. He prescribed new energizing ideas as a panacea, and hit on combining the mature judgment of older senior board members with new younger men's more progressive, radical ideas, toned down and modified.

Seventeen bright young assistant department managers and interested lesser lights were called together to express their ideas through a "junior executive" board. The object was to train new blood for the senior board, and to infuse new ideas to be tempered with the more mature judgment of the older men.

Groundwork was laid in 1932 with regular rules and laws set up to

(*Please turn to Page* 20)

NO TEMPLE OF *Thaumaturgy*

The Greeks had a word for the working of wonders – thaumaturgy – but it finds no application in this new "Home of Armco Research." No miracles are performed here. Day by day earnest chemists and metallurgists strive for new and better products; probe for the solutions to customers' problems; carry on a systematic program of research to improve flat-rolled iron and steel and their methods of manufacture. In this constant quest of the unknown perhaps we can be of service to you, especially if you have thus far failed to find the materials you really need. ☛ Write for a copy of our new booklet on Armco Research and, if you like, tell us your problem. The American Rolling Mill Company, 20 Curtis St., Middletown, Ohio.

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STEEL
FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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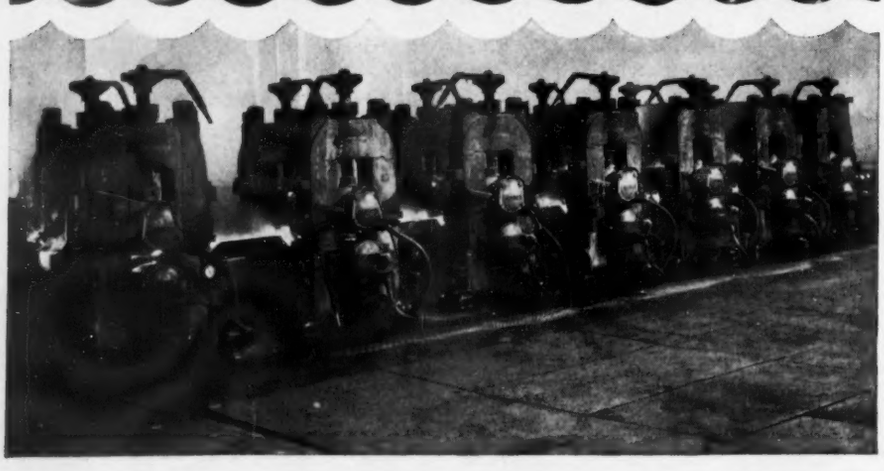
PRODUCTION · PROCESSING · DISTRIBUTION · USE

The diver is only part of the picture. His equipment has been checked and double-checked; and on the surface a well-drilled crew is alert to every detail . . . Because of this perfect coordination, diving is generally less hazardous than cleaning windows!



WHAT IF THE AIR LINE FAILS?

It *could* fail, of course; but every precaution has been taken to insure the diver's safety *in any event.*

These three words "in *any* event" have guided Morgan construction of continuous rolling mills. Morgan Construction is complete, and thorough to the last detail.

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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

CURRENT developments indicate that a rapprochement between business and government is in the making. More and more, we believe, industrialists are accepting the doctrine of conciliation expressed in these words at a recent Pittsburgh meeting: "A sensible co-operative relationship between business and government is vital to the welfare of any nation. Business and government should not be hostile. Government cannot exist without business any more than business can exist without government. It is time for them to stop heckling each other and to find means for being mutually helpful." The policy thus described is essential to business recovery.

• • •

Must Get Together

The quotation is from an address by A. F. Jackson (p. 15) at a meeting of the Malleable Founders association, of which he is president. History probably will show that his words are more prophetic and certainly more appropriate under conditions existing today than the bombastic and belligerent words of another contemporary Jackson that were publicized so prominently a few weeks ago. The public reaction to the conference of the President with five business leaders (p. 29) and to the testimony of industrialists before the senate committee investigating the recession has been most favorable. Sane-minded persons are fed up with aimless backbiting.

• • •

They Think Us Unwise

We who are identified with business in America will do well to consider the viewpoint of the top men of finance and industry in the countries of Europe which still retain a democratic form of government. The "economic royalists" of London, Liverpool, Amsterdam, Zurich, Copenhagen, Brussels, etc. cannot understand why American business men waste time publicly hating and damning the government. In European countries, business men have taken it for granted that they must deal with government administrations that may range all the way from reactionary conservatism to violent radicalism. They have perfected a strategy to deal successfully with government—regardless of its political or economic complexion. Can it be true that we in the United States have been so coddled and weakened by almost continuous conservative administrations that we do not know how to act when a liberal administration is in power?

• • •

Prices Are Reasonable

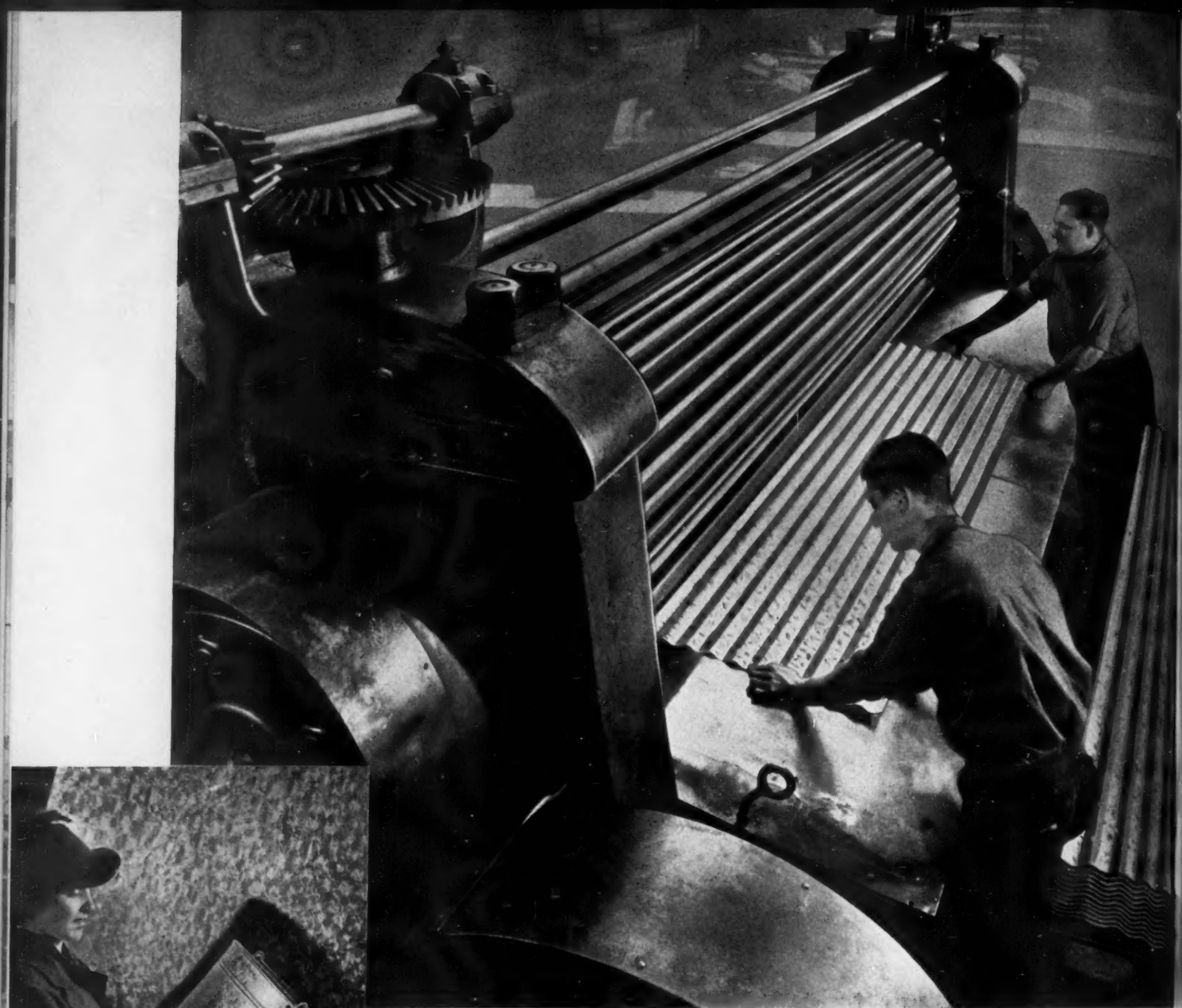
It is refreshing to read a government report favorable to industry. Assistant Secretary of the Navy Edison, reporting on the results of a survey on steel prices made by the navy department at the request of President Roosevelt (p. 15) stated that the investigation showed that private companies had been selling steel to the government at reasonable prices despite identical bidding. He also declared that the government actually was paying less for its steel than many other buyers. In itself this statement may be of small moment, but it is testimony that helps to take some of the sting out of the unfair accusations that have been so prevalent in the past. A little sweet with the bitter always helps.

• • •

Business Is Improving

If warehouse inventories may be taken as a criterion of consumer stocks (p. 19), improvement in the demand for steel should be felt shortly, declares W. S. Doxsey of the American Steel Warehouse association. . . . Activity is mounting gradually, as reflected by a 3-point gain in the rate of steelworks operations (p. 18) and a moderate increase (p. 25) in automobile output. . . . While the process of rolling steel direct from molten metal has not been developed to the point of success on a commercial basis (p. 47), encouraging progress in direct rolling has been made—particularly on nonferrous metals. . . . Use of galvanized sheets on farm buildings always has been an attractive market for this product. A midwestern company has developed designs for metal-clad farm buildings (p. 52) involving the use of galvanized sheets not only for new structures but also for modernizing old buildings.

E. L. Shaner



Inland Galvanized Sheets Are Setting New Standards

New standards for service life and uniform workability are resulting from Inland's improved methods of producing galvanized sheets. First, the most modern methods and equipment are used in producing the base metal sheets; second, Inland's new equipment and improved method of galvanizing assures a secure bond between steel sheet and coating.

Examine an Inland galvanized sheet. You will find no streaking. Temperature is held uniform during the galvanizing process. While this uniformity of appearance is only a surface feature, it is indicative of the closer bond and longer life of the coating.

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Scrap Convention Voices Plea for "Open Markets", "Better Understanding"

■ CLASS legislation directed against the iron and steel scrap industry has no economic or legal justification, Michael V. Bonomo, Schiavone-Bonomo Corp., New York, and president, Institute of Scrap Iron and Steel Inc., told 500 members in Atlantic City, N. J., last week for the celebration of the institute's tenth anniversary.

No fact or circumstance makes the scrap problem different from a legislative point of view than that of steel, cotton, wheat, oil, copper and other materials, Mr. Bonomo declared.

In October, 1936, Mr. Bonomo delivered an address at Detroit in which he said this country produced more scrap than it consumed annually, that there was no shortage of scrap and that it would be in the best interests of the scrap dealer, producer and consumer to harmonize mutual interests.

"I am still of that opinion," he asserted.

"In many parts of the country domestic mills are unable to absorb all the scrap produced in their territory. Export markets have taken up the slack. Take present conditions in the steel industry. It can be proved that this country has an exportable surplus of scrap, in the same terms as we express it in connection with cotton and wheat.

Scrap Exports Economically Sound

"It is my firm conviction that shutting the door today to foreign markets would be injurious to both the interests of the steel industry as well as of the scrap trade. The damage would be represented by tens of thousands of men thrown out of employment; roadsides and dumps would be cluttered with all kinds of old iron which would never see the light of day; an industry would be prostrated and on the verge of bankruptcy as it was in 1932.

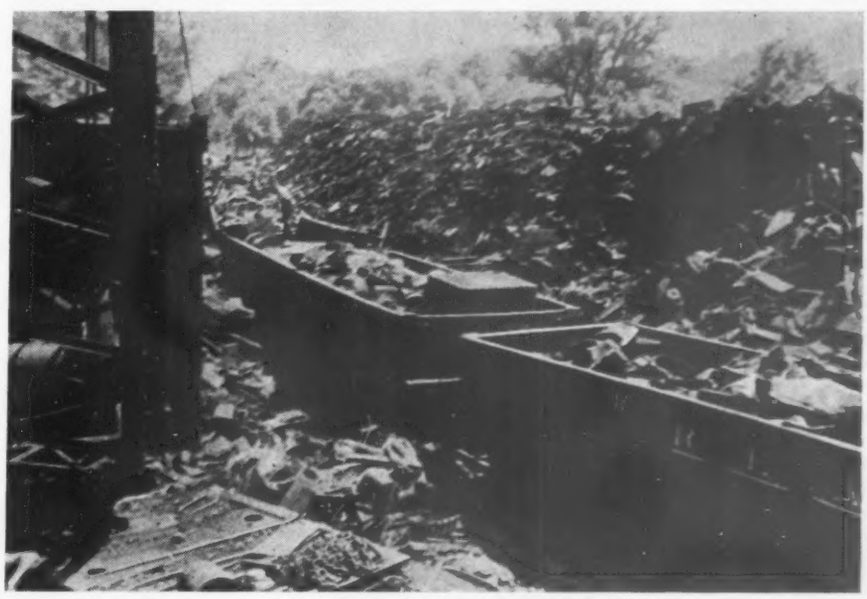
"It is small wonder that we have taken a keen interest to preserve all free and open markets, while extending our fullest measure of cooperation to those who have first claim upon our service and commodity. It is my contention that scrap exports are economically sound for both the steel and scrap industries, and were it not so, it would soon come to an end, by force of economic law.

"We have followed the institute under trying conditions, in a dignified attitude, biding our time for the fair and just solution of this problem. Slowly and surely poisonous propaganda is smashing itself against the bulkhead of truth and facts."

Looking into the future, Mr. Bonomo saw stabilization of domestic scrap in equilibrium with world markets. He predicted a day when scrap will move steadily to consuming mills at prices conforming with those received for finished products. Scrap yards will work on a steady schedule, he said, shipping material as fast as produced. Finally, Mr. Bonomo visualized a steady flow of surplus material abroad, handled according to the best trade practices, and receiving preferential treatment.

"To our customers, I wish to point out that there are certain fundamental principles that must be recognized for the protection of our mutual interests," Mr. Bonomo continued. "They must understand the scrap iron dealer is entitled to a fair return for his service; otherwise there is no incentive to gather the scrap; that they cannot compete with the dealer at the same sources and still expect him, with expensive equipment idle, to render

"Steel Never Dies"

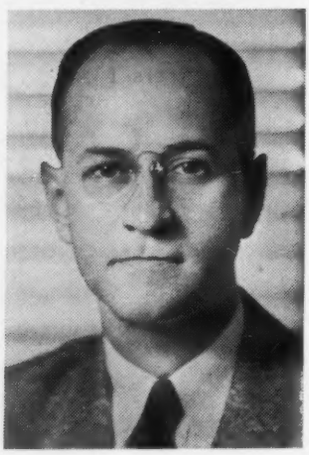


■ **"Steel Never Dies" is the dramatic title of a motion picture film made by Paramount Pictorial in the yards of members of the Institute of Scrap Iron and Steel. Exhibited in many theaters—indicating popular interest in the subject—it is considered a valuable contribution to the industry. It illustrates how scrap is collected and prepared for market, and its importance to the nation as a raw material**

that continuous and efficient service which they have demanded and which they will expect.

"The dealer has learned that the foundation for his business is service to his domestic consumers and that they have first claim upon him for consideration. Both must recognize that their mutual interests are best protected in an open market, where the law of supply and demand is the principal guide."

Mr. Bonomo traced the history of the institute since its formation ten years ago when a group of dealers met in the Astor hotel, New York, to discuss mutual problems. Oppressed by new forces beyond their control, harassed by unfair competition, these men counseled with each other. Mr. Bonomo praised



Benjamin Schwartz

Re-elected director general, Institute of Scrap Iron and Steel

Benjamin Schwartz who, as director general, has guided the institute through the ten years. The institute now has 17 chapters, located from coast to coast, with more than 700 members, a record total.

Five arbitration hearings were held at the convention involving contractual disputes between members of the institute ranging in amounts from $100 to $5000. More than 250 arbitrations have been held under the rules of the institute. Arbitration procedure provides each of the parties to a dispute select a member as an arbitrator. Mr. Schwartz is the third arbitrator, or impartial chairman in each case.

The institute board of directors approved formation of an insurance company for the scrap industry. Charter for such a company, to be called the Institute Mutual Insurance Co., has just been granted by New Jersey. Eventually, it will operate in all states where there are institute members.

According to Mr. Schwartz, the move was taken to counteract increasingly high rates imposed and as the result of the discriminatory attitude on the part of insurance companies. The scrap trade's annual insurance premium bill now approximates $2,500,000. New York state dealers operate an insurance pool under the New York state insurance fund. The first year of operation produced a return below the manual rate for scrap iron yards of approximately 45 per cent.

Charles Gordon Smith, manager of the New York state insurance fund, explained New York dealers reduced cost mainly by preventing accidents through an intensive, unremitting, co-operative safety campaign. He said dealers in other states have practically the same opportunity to reduce accident frequency and severity and thus lower insurance costs.

Adopt Humanitarian Policy

Sam H. Bassow, of Bassow Bros., New York, revealed how insurance costs can be reduced by adopting a humanitarian policy. His company provides workmen with lunch rooms, lockers, showers, raincoats, boots and goggles without cost. Safety shoes and leather gloves are furnished at cost. Other safety measures include clean yards and provision of adequate space around shears and other equipment.

Another problem facing the scrap industry is marketing of No. 2 hydraulic-compressed bundles. Steel mills generally are skeptical of this material and purchase it only when necessary. This was brought out in another discussion by Mr. Bassow. Now conducting a survey among consumers, Mr. Bassow finds No. 2 bundled scrap containing auto body and all other black sheet material free of highly objectional plated and foreign matter is as good and better than common No. 2 steel and justifies a price between this grade and No. 1 steel.

The problem best can be attacked, he said, through well organized, centralized co-operative effort.

In discussion from the floor, it was suggested No. 2 bundles could be prepared carefully and tagged or marked by the producer. The mill then would be able to identify the products of reliable scrap merchants.

In discussing prospects for the steel industry, C. E. Wright, managing editor, *The Iron Age*, said inventories of steel in consumers' warehouses are not completely liquidated and will have a tendency to curb new buying immediately. Most steel consumers will require less steel in 1938 than in 1937.

Mr. Wright expects the auto industry to take around 6,000,000 tons of steel this year. Even if no more than 10 per cent increase in freight rates is granted, this will prove a stimulus to railroad buying by adding 50 cents to a dollar or more a ton to the delivered cost at a great many consuming plants.

He said there is room for great improvement in buying by the railroads themselves but no building boom is in sight for this year although the government's housing program may be helpful. Mr. Wright placed 1938 steel output at somewhat more than the 34,000,000 tons produced in 1935 but less than the respective totals of 48,000,000 and 50,000,000 tons for 1936 and 1937.

Tracy E. Herrick, vice president, Cleveland Trust Co., Cleveland, praised Mr. Schwartz for his accomplishments during the history of the institute and the compelling en-

Michael V. Bonomo

Re-elected president, Institute of Scrap Iron and Steel

ergy with which he meets new issues.

Mr. Schwartz paid special tribute to past presidents of the institute at the annual banquet Thursday evening. The past presidents include Joseph G. Hitner, Philadelphia; Herman D. Moskowitz, New York; Samuel N. Summer, Columbus, O.; Joel Claster, Philadelphia; Darwin Luntz, Canton, O.

The banquet was a dinner dance with no "principal speakers." On Wednesday evening, the first night of the convention, President and Mrs. Bonomo were hosts at a reception and informal supper dance.

A feature of the business session Friday was reports by chapter presidents. Milton Levenson, Roxbury Iron & Metal Co., Dorchester, Mass., president of the Boston chapter, declared the export market a life-saver for New England dealers. The only real New England consumer, he said, is the American Steel & Wire Co., Worcester, Mass., outside of some small foundries.

"When this market is not buy-

ing," he declared, "we depend solely on the Pennsylvania market. These steel mills buy their scrap whenever they see fit, and the dealer is left holding the bag with regard to price and shipping instructions."

Mr. Levenson said price control was the real reason back of the bill introduced in congress to license scrap exports, because the steel industry controls every raw material including iron ore, pig iron, coal, coke and limestone. The only raw material which operates in an open market is scrap, he said. The Boston chapter ran a series of advertisements in a purchasing magazine to counteract propaganda against scrap exports.

Arthur R. Robinson, R. L. Batteiger Co., Philadelphia, president, Philadelphia chapter, recommended forming an advertising and publicity bureau to tell the industry's story to the public.

The New York area chapter members solved their labor problems without strike or conflict last year, Joseph A. Moskowitz, Samuel Sons Iron & Steel Co., Brooklyn, N. Y., and president of the chapter, said. New York yard men work five 9-hour days per week with a minimum wage of 45 cents per hour applying to yard workers and 65 cents to chauffeurs. The Boston, Capital district, Detroit and Philadelphia chapters handled labor relations along the same basic lines.

Chapter Presidents Speak

Other chapter presidents who delivered brief addresses were Joseph E. Jacobson, Luria Bros. & Co., Pittsburgh, of the Pittsburgh chapter; Hyman Moskowitz, Moskowitz Bros., Cincinnati, of the Cincinnati chapter; Charles O. McIntosh, West Hartford, Conn., of the Southern New England chapter; Harry J. Keiner, Hickman, Williams & Co., St. Louis chapter; Harry W. Symansky, Symansky Bros., Troy, N. Y., of the Capital district chapter; Ed Stein, United Iron & Metal Co., Canton, O., of the Cleveland chapter; Abe Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va., of the Southern chapter.

Ben Kramer, Modell Iron & Metal Co., Detroit, of the Detroit chapter; Barney H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J., of the New Jersey chapter; D. Sloan Hurwitz, Hurwitz Bros. Iron & Metal Co. Inc., Buffalo, of the Buffalo chapter; Max Schlossberg, M. S. Kaplan Co., Chicago, of the Chicago chapter; and A. Diefenthal, Southern Scrap Material Co., New Orleans, La.

Mr. Bonomo was re-elected president of the institute at the closing session. Joseph E. Jacobson, Luria Bros., Pittsburgh, was named vice president; George Sturm, David J. Joseph Co., Cincinnati, secretary; and Thomas F. Kelly, Brooklyn, treasurer.

Mr. Schwartz will continue as director general.

Six members-at-large were elected to the board of directors. Board will consist of the presidents of the 17 chapters and Joel Claster, Luria Bros., Philadelphia; David Pollock, Pottstown, Pa.; Frank Contey, Jersey City, N. J.; E. L. Solomon, Max Solomon Co., Pittsburgh; L. J. Borinstein, Indianapolis; Harry Harris, Harry Harris & Co., Chicago.

The convention next year will be held in St. Louis.

A resolution adopted at the closing session provides for inclusion of mill specifications in contracts between brokers and dealers.

Awards were presented to three members who showed records of no accidents during a safety contest conducted by the institute in New York state. First prize went to Bassow Bros., New York; second to Empire Waste Materials Co., Poughkeepsie; third to Charles K. King Inc., Brooklyn.

BROADEN HEARINGS ON EXPORT RESTRICTIONS

■ The senate committee on military affairs last week decided to go ahead with hearings on bills to prohibit exports of iron and steel scrap, except under license, as soon as interested parties are ready to testify.

The committee announced that scope of the hearing will be broadened to include other strategic materials, but did not name them.

It is understood a subcommittee probably will consider materials other than scrap.

Aluminum Co. Going Ahead with Expansion

■ "Despite a falling off in orders in the past three months of more than 60 per cent, the Aluminum Co. of America has not curtailed production of ingots," declares Roy A. Hunt, president. Continued output, he says, is having a steadying influence on employment.

"In the lean years after 1929, the company followed this general policy, maintaining production greatly in excess of shipments until it had accumulated a stock of more than 300,000,000 pounds of aluminum—literally acres of it—a total of more than three times the average annual shipments during that period and about one-third more than its entire shipments in the boom year of 1929."

The company is continuing its $26,000,000 expansion program, announced last year, Mr. Hunt said.

Steel Prices Fair, Is Navy's Report

■ STEELMAKERS have been selling steel to the government at reasonable prices, despite identical bidding, Assistant Secretary of Navy Edison said last week. Edison's statement followed a conference with the President during which he reported results of a survey of steel prices made at the President's request.

Mr. Edison said steel companies had opened their books to government experts and that the survey showed the government actually was paying less for its steel than many other buyers.

Investigation was conducted by the procurement division, treasury department and navy department.

"Business, Government Should Stop Heckling"

■ More research and the development of co-operation between government and business are the outstanding needs of industry, A. F. Jackson, vice president, Michigan Malleable Iron Co., Detroit, and president of the Malleable Founders' society, said in addressing a meeting of the society's committee on new uses, in Pittsburgh.

"Industry can develop new markets and expand its value to society only by continuing to apply scientific research to its everyday problems," he stated. "In line with his belief, the Malleable Founders' society is studying plans to extend its research activities.

"A sensible co-operative relationship between business and government is vital to the welfare of any nation. Business and government should not be hostile. Government cannot exist without business any more than business can exist without government. It is time for them to stop heckling each other and to find means for being mutually helpful."

Senate Committee Hears Tower, Fairless Jan. 21

■ Late last week the date for the appearance of Walter S. Tower, executive secretary, American Iron and Steel institute, and Benjamin F. Fairless, president, United States Steel Corp., before the special senatorial committee on unemployment, was changed from Jan. 19 to Jan. 21 or 22. The appointment for Jan. 19 was a postponement from the previous Friday. (See page 30).

230 Exhibitors, $10,000,000 in Equipment, at National Road Show

■ MORE than $10,000,000 worth of equipment is on display in Cleveland this week, Jan. 17 to 21, for the Thirty-fifth annual convention and exposition of the American Road Builders' association. Two hundred and thirty exhibitors occupy six and one-half acres of floor space in the public auditorium and Lakeside exhibition hall.

With an expected attendance of 25,000, the "road show" well represents a large industry. According to the association, more than 4,000,000 persons depend upon highway construction for sustenance. It estimates that for each $100,000 spent on highways, $315,000 worth of business is involved, including reinvestment projects. Other figures show 15 to 30 per cent of traffic fatalities are due to inadequate highways.

More than 2,000,000 of the country's 3,000,000 miles of highway systems are still unsurfaced mud roads. "Improved roads" are mainly gravel, as only 113,695 miles have a stable base, and less than 8000 miles are more than two lanes wide.

Large Equipment Investment

A recent survey shows that for every $100,000,000 of highway construction, 21,500 net tons of reinforcing steel and 8500 net tons of structural steel are required. Indicating the large investments involved in equipment, one authority says that hard surfacing a typical 5-mile stretch costing about $30,000 per mile for a high-grade concrete job, requires equipment costing $75,000 to $100,000 depending upon the amount of work required for grading, leveling, etc. Similarly, on a black-top job with the cost per mile about $10,000, equipment required is between $25,000 and $33,000. Such figures serve to indicate the huge market for road building equipment.

Steelmakers Represented

Practically all leading steel manufacturers and equipment builders are represented. Late last week many displays were still being installed. Features will be described in the Jan. 31 issue of STEEL.

The exhibit of Caterpillar Tractor and allied companies occupies the entire main floor of the auditorium. Cutaway models of various mechanisms are employed to show details. Large equipment in this exhibit includes a 15-yard "buggy" and a 12-yard scraper made by LeTourneau of welded steel; a 15-yard LaPlant Choate "Carrimor" also welded, and an 18-yard Athey wagon. Said to be the largest in the world, a giant Caterpillar diesel tractor is shown having a drawbar pull of 96 horsepower.

One of the trends most noticeable is the increased use of welding in the heavier machinery. Welded equipment includes Bucyrus Erie and Koehring 1½-yard shovels, a Thew-Lorain 2½-yard dragline, and 2-yard shovels built by Link Belt Co., Lima Locomotive Works Inc., and Marion Steam Shovel Co. Northwest Engineering Co. has a 1¾-yard shovel of welded steel.

About 50 per cent of all the equipment is welded, considerably more than that exhibited at last year's show.

Other trends in equipment include the use of rubber tired wheels on the heavier machinery. One authority estimates that 85 per cent of earth handling equipment is now on rubber, which represents an increase of about 30 per cent compared to a year ago. Diesel engines are much in evidence, about 75 per cent of the equipment being so powered.

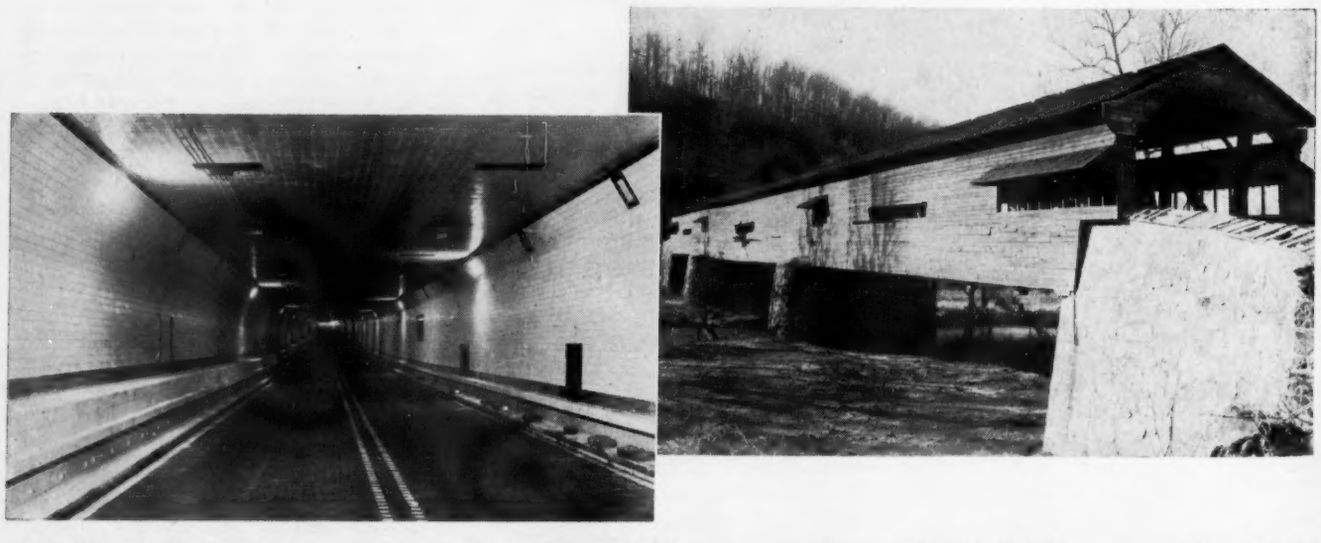
Koppers Co. Awarded Modernizing Contracts

■ Koppers Co., Pittsburgh, has been awarded a contract by Dominion Steel & Coal Corp. to modernize its light oil recovery plant at Sydney, Nova Scotia, Canada. Amount of the contract was not revealed.

The company also has just been awarded a contract for erecting a battery of 69 low-differential Koppers-Becker ovens with self-sealing doors for Republic Steel Corp. at Youngstown, O.

The new ovens will replace 61 old ovens and will increase coke production about 15 per cent to 90,000 tons per month. They will be ready for operation about Sept. 15. Additional equipment to modernize Republic's by-product plant will also be provided by Koppers.

Here Today, but Centuries Apart



■ **Highway builders envision reconstruction work in metropolitan districts on a scale with that being done in New York, where the Lincoln tunnel, left, recently was completed. Covered bridges, such as that illustrated at the right, still are in use in Pennsylvania and some other states**

More Armament, or Steel Plants?

Europe Puzzled Over Which Is First

LONDON

■ RESHAPING of Europe still hinges on the strategy of metals. Rearmament races and industrial rehabilitation and expansion programs have placed iron and steel at a premium.

Italy and Germany, contenders for continental leadership, lack rich iron ore deposits. Germany's ore is rather lean. Italy is largely dependent on imported ore and reworking ore which once was smelted inefficiently in ancient forges.

It is no secret that both covet the rich Rubio deposits near Bilbao in northern Spain. Access to these would be one of Europe's choicest plums.

Many obstacles, however, remain in the road to Bilbao. Among these is the lack of finances. Given access to the Rubio deposits, it is improbable either Germany or Italy could finance their development without outside aid. General opinion in Europe is that the only country not hamstrung by a lean purse is England.

Puzzling questions to be decided by continental powers include whether to spend what money is available for new battleships, airplanes and other armaments, or for new blast furnaces, steelworks and other industrial equipment; whether to forge plowshares from swords or swords from plowshares.

Regardless of lack of finances and rich ore deposits, Europe must have steel, and to this end attention is being turned toward improved smelting of the lean ores available.

Germany Plans Steelworks

Germany, as noted recently, contracted for the construction of three modern steelworks to be located on native ore deposits. This is interpreted as a move for self-sufficiency and is a part of the reich's program to increase use of native resources.

The projected plants include ore mining plants and development, ore preparation, coke ovens, blast furnaces, steelworks and rolling mills. They are designed to smelt the low-grade native ores. The first of these is expected to produce 1,000,000 tons of ingots annually by 1940.

Full control of the German iron ore industry has been assumed by the government which will exploit all ore resources, including lean deposits, and will control and reduce imports. Formerly Germany received much of its ore from Spain and Sweden.

Pending further development of its steelworks, Germany has felt the pinch of an insufficient supply and has placed restrictions on the use of iron and steel. Substitutes, wood, concrete and other materials, must be used where possible.

Great Britain, also limited in rich ore deposits, is continuing to develop steelworks which will utilize its lean ores and during the past several years has augmented greatly its steelmaking capacity.

The British Iron and Steel federation reports the country's industry now is equipped to produce, and is producing, at an annual rate far in excess of 1929 or any prior year.

Cutput of steel ingots and castings in Great Britain in 1937 was 12,900,000 tons, representing an increase of 3,000,000 tons in the last two years and comparing with 9,600,000 tons in 1929.

Scrapping and reconstructing of the older plants and extending large integrated works has proceeded rapidly in the past few years. Since 1936 work has been accelerated in accordance with the unusually sudden upswing in demand for steel, and new furnaces have in practice become available faster than have supplies of necessary raw materials.

At the close of 1937, the aggregate steel furnace capacity stood at 13,500,000 tons a year, compared with 12,750,000 tons at the end of 1936, and approximately 11,000,000 tons at the end of 1929. These furnaces are producing at practical capacity.

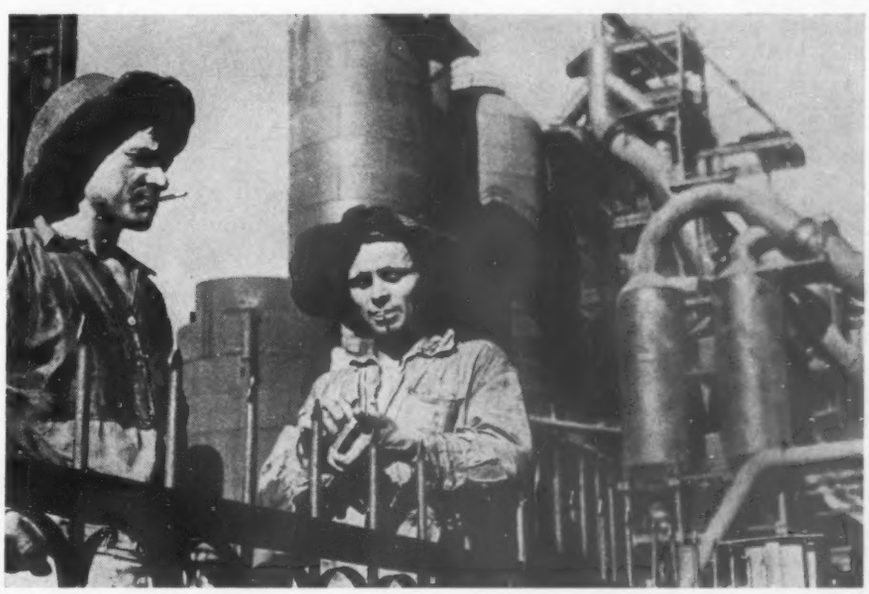
The British steel industry is estimated to have spent £20,000,000 in new and reconstructed equipment in the past two years. In 1929 the capital expenditure was only £2,300,000. Further work is proceeding on large projects in South Wales, on the Clyde, in Lincolnshire and elsewhere. These, it is estimated, will require expenditure of more than £10,000,000 in 1938.

By the end of 1938, steelmaking capacity will be more than 14,000,000 tons per year.

Noteworthy features of the expansion are: Larger pig iron capacity at steelworks; increasing use of local ores through the basic open-hearth and the basic bessemer processes; a large increase in the number of steelmakers' own coke ovens and the development of rolling mill practice.

Record activity has involved a record volume of earnings for iron and steelworkers. It is estimated the total earnings paid in 1937 amounted to £49,000,000, which compares with £41,000,000 in 1936 and £38,000,000 in 1929.

Russia Strong on Steel, Buying Presses Elsewhere



■ **Although Russia produced 68 per cent more pig iron and 31.8 per cent more raw steel than Great Britain in 1937, the Russians last week were reported to have bought a 15,000-ton armor plate press in Sheffield, England, and were seeking to purchase other equipment for battleship construction, in England and United States. Only the United States and Germany outranked Russia as an iron and steel producer in 1937, (See STEEL, Jan. 3, p. 291.) This Sovfoto depicts blast furnace workers at Stalin Metallurgical Combine in Magnitogorsk**

PRODUCTION

■ MODERATE upward tendency in steel production is indicated. Increases were reported last week in six districts, no change in four, and a slight decline in two. As a result the national average was up 3 points to 29 per cent.

Cleveland—Off 2 points, to 24 per cent, due to one open hearth being taken off.

Cincinnati—After a week in which all open hearths were idle steelmakers in the Cincinnati district resumed last week at 28 per cent.

Pittsburgh—Declined 1 point to 24.5 per cent. Almost daily fluctuations in activity to meet requirements are made by all mills, without definite trend being indicated.

Wheeling—Advanced 9 points to 35 per cent with three furnaces lighted at midweek. Further addition of three open hearths is planned for this week, indicating a further rise.

Chicago—Increased 2 points to 26.5 per cent, the best rate in five weeks. Blast furnace schedules are unchanged with 14 of 39 stacks active.

Buffalo—Unchanged at 23 per cent with 10 of 43 open hearths operating.

Detroit—Up 19 points to 52 per cent with four idle furnaces relighted. One rebuilt Ford furnace has been put in service at increased capacity and another has been put out for rebuilding.

Central eastern seaboard—Slight variations in ingot production have balanced gains and losses and the operating rate is unchanged at 31 per cent. A slight increase is indicated for this week.

New England—Gain of 7 points in operations has carried the rate to 26 per cent. Indications for this week are for a slight decline, probably to about 20 per cent.

Birmingham, Ala.—Steady at 63 per cent with indications for continuance through this week.

St. Louis—Production rate continues at 21 per cent, the same as last week. Addition of two open hearths is planned for this week.

Youngstown—Moved up 1 point to 25 per cent, with 30 open hearths, 6 blast furnaces and 1 bessemer operating. Schedules for this week indicate the same rate or slightly lower.

■ A million man-hours without a "lost-time" accident. This is the 1937 record established by the personnel of the Columbia Steel Co.'s tin mill, Pittsburg, Calif., including 450 employes. Columbia is United States Steel Corp.'s western subsidiary.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Jan. 15	Change	Same week 1937	Same week 1936
Pittsburgh	24.5	− 1	80	41
Chicago	26.5	+ 2	77	52.5
Eastern Pa.	31	None	53	37
Youngstown	25	+ 1	77	64
Wheeling	35	+ 9	94	68
Cleveland	24	− 2	80	67
Buffalo	23	None	84	45
Birmingham	63	None	76	41
New England	26	+ 7	88	93
Cincinnati	28	+28	92	75
St. Louis	21	None	80	†
Detroit	52	+19	95	88
Average	29	+ 3	79	52.5

†Not reported.

Domestic Machine Tool Orders Drop; Exports Up

■ Domestic machine tool orders receded further in December to the lowest monthly volume since March 1935, almost the beginning of the recovery period. Index of the National Machine Tool Builders association, Cleveland, stood at 53.5, compared with 63.3 in November, and 232.5 for April, the high month of the year.

Foreign orders were equal to the best of the year and represented 63 per cent of the total business. Foreign orders index was 89.2, compared with 64.4 in November.

With the heavy export sales, the total index for the month was 142.7, or 10 per cent above November.

Average index for 1937 was 186.9, of which foreign orders made up 31 per cent. Average index for 1929 was 155.8.

Machinery orders in the last quarter of 1937 dropped 30 per cent below the preceding quarter, William J. Kelly, president, Machinery and Allied Products institute, reported last week at the senate hearing on unemployment and relief. Employment, he said, was down 20 per cent.

Concensus of manufacturers reporting in an institute survey was that machinery business in the first half of 1938 would be about 41 per cent of the volume for the first half of 1937.

U. S. STEEL CORP. SHIPMENTS
(Inter-company shipments not included)
(Tons)

	1937	1936	1935	1934
Jan.	1,149,918	721,414	534,055	331,777
Feb.	1,133,724	676,315	583,137	385,500
Mar.	1,414,399	783,552	668,056	588,209
April	1,343,644	979,907	591,728	643,009
May	1,304,039	984,097	598,915	745,063
June	1,268,550	886,065	578,108	985,337
July	1,186,752	950,851	547,794	369,938
Aug.	1,107,858	923,703	624,497	378,023
Sept.	1,047,962	961,803	614,933	370,306
Oct.	792,310	1,007,417	686,741	343,962
Nov.	587,241	882,643	681,830	366,119
Dec.	489,070	1,067,365	661,515	418,630
Y'rly adj.		†40.859	†23,750	†19.907
To.	12,825,467	10,784,273	7,347,549	5,905,966

†Deduction.

Home Equipment Sales Expected on 1936 Level

■ Sales of home furnishings, including such products as refrigerators, stoves, electrical appliances and washing machines are expected to decline this year to about the 1936 level, but the trend in the second half is likely to be upward.

This was the opinion expressed last week at the Chicago exhibit of the National House Furnishing Manufacturers association. Retail sales of home furnishings in 1937 are placed at about 9 per cent ahead of 1936. Vacuum cleaner sales were the largest in history, while ironer manufacturers had a similar record. Washer sales were the second best on record.

The exhibit of major home appliances revealed more widespread use of porcelain enameled parts for ranges, refrigerators and washing machines. White predominates the color scheme for such products almost exclusively. American Rolling Mill Co., the only steel company represented in the exhibit, featured a display of tableware, dining hollowware, kitchen utensils, and literature concerning stainless steel fabrication and porcelain methods.

Steel Corp. Shipments Gain 18.47% in 1937

■ Shipments of finished steel by the United States Steel Corp. in December totaled 489,070 tons, a loss of 98,171 tons from the 587,241 tons shipped in November. In December, 1936, shipments totaled 1,067,365 tons.

For all of 1937, without adjustment, shipments totaled 12,825,467 tons, compared with the adjusted total of 10,784,273 tons. Compared with the total for 1936 before yearly adjustment the gain was 2,000,335 tons, or 18.47 per cent. In 1929 total shipments were 15,234,355 tons.

■ Continental Can Co. Inc., New York, declared an interim dividend of 50 cents a share on common stock, payable Feb. 15 to holders of record Jan. 25.

Warehouse Stocks Point to Upturn in Steel; Better Balance Appearing

■ "IF WAREHOUSE inventories may be taken as a criterion of consumer stocks, improvement in demand should be felt shortly," said W. S. Doxsey, executive secretary, American Steel Warehouse association, last week.

"The warehouse with stocks as much as 30 per cent above those of a year ago is an exception. It is estimated that inventories in the distributing industry, as a whole, are now about 15 to 20 per cent above steel on hand in December, 1936.

"Numerous items are entirely depleted and are being replenished from day to day. Despite the sharp decline in warehouse sales from last spring to December, distributor sales, relatively, are considerably in excess of steel production, pointing to prospects for continued improvement in the ingot making rate."

Mr. Doxsey stated that normally business done by steel distributors is "an exceptionally accurate measure of general steel consumption." About one-seventh of all steel produced is so distributed, reaching all classes of consumers and related closely to business activities in all parts of the country.

The general belief that as steel goes, so goes the nation, Mr. Doxsey declared is "fallacious, misleading and dangerous.

"With steel operations under 30 per cent today, if this epigram held true, the nation's economic activity would be decelerated to an alarming extent."

In support of this, he cited the following figures: In January, 1937, the steel rate was 78.7 per cent. By April this had increased to 91.5—a gain of 16.3 per cent. In the same period, as measured by a reliable index, general business and industrial activity advanced from 103.8 per cent in January to 106.7 per cent in April—a gain of only 2.8 per cent.

From January to April, the acceleration in steel ingot production proceeded at 5.8 times the rate of general business.

The disparity during the months of business decline was even more marked. The steel rate dropped from 91.5 per cent in April to 26.4 per cent in December while business activity, 106.7 per cent in April, receded to 84.4 per cent in December.

The steel rate from its peak to December fell off 71.4 per cent, while the percentage decline in general business activity was only 20.9 per cent.

"Both on the rise and the fall the steel rate proved an inaccurate gage of business activity or prosperity in this country," he said.

The warehouse association's records reveal an increase in sales of 47.2 per cent from January, 1937, to the high point of the spring. From this peak sales dropped 61.8 per cent to the point reached in December.

Warehouse sales for 1937 are estimated at 24 per cent above those of the preceding year, while steel ingot production for 1937 was 6 per cent ahead of the 1936 output.

W. S. Doxsey
Executive Secretary, American Steel Warehouse association

"Ordinarily, warehouse sales follow steel production rather closely when measured over a 12-month period," said Mr. Doxsey. "The relatively better showing of warehouses in 1937, of course, is accounted for largely by the spring stampede for steel."

MEETINGS

WAREHOUSE CONVENTION IN NEW YORK, MAY 3-4

■ The twenty-ninth annual convention of the American Steel Warehouse Association Inc., will be held in the Waldorf-Astoria, New York, May 3 and 4, W. S. Doxsey, executive secretary, 442 Terminal Tower, Cleveland, announces. Meetings of directors and committees will be held on the day preceding and following the convention.

WELDING PAPERS FEATURE A.I.E.E. MEETING PROGRAM

One session of the annual winter convention of the American Institute of Electrical Engineers at the Engineering Societies building, New York, Jan. 24-28, will deal with electric welding. This session on the afternoon of Jan. 26 schedules the following papers: "Recent Advances in Resistance Welding," by C. L. Pfeiffer, chairman, resistance welding subcommittee; "Mechanical High-Speed Resistance Welder Control," by F. H. Roby, Square D Co.; "Interpretation of Oscillograms of Arc Welding Generators in Terms of Welding Performance," by K. L. Hansen, Harnischfeger Corp.; and "Rating of Resistance Welding Transformers," by C. E. Heitman, Edward G. Budd Mfg. Co. A session on the morning of Jan. 25 will be devoted to electronic control of motors.

PURCHASING AGENTS GROUP IS ARRANGING A DEBATE

Purchasing Agents Association of New York is sponsoring a dinner conference at the Pennsylvania hotel, Feb. 15, on the theme "How right is the salesman; how right is the purchasing agent?" W. H. Oliver, district sales manager, Republic Steel Corp., will present the salesman's point of view and John K. Conant, purchasing agent, General Printing Ink Corp., the viewpoint for the buyers. Points of difference will be ironed out before a representative group of industrial buyers and sellers. Carleton Reynell, purchasing agent, Worthington Pump & Machinery Corp., is arranging the conference.

Testing Firm Observes Fiftieth Anniversary

■ Fifty years of service to the construction, railroad and manufacturing industries will be observed in 1938 by the Robert W. Hunt Co., Chicago, inspecting, testing and consulting engineers.

The company does inspection work for over 50 per cent of the railroads, including complete inspection of rails for roads representing 65 per cent of the country's trackage.

Government war materials, machinery purchased during the World war and such projects as the Chicago Merchandise Mart building have been tested by this organization.

Notes 75th Anniversary

■ Commemorating the seventy-fifth anniversary of its founding, William B. Pollock Co., Youngstown, O., has issued a bronze medal. Obverse side depicts a blast furnace recently fabricated and erected by the company, while the reverse shows a modern Pollock hot metal car, probably the best known of the company's products.

Predict Gains in Air Conditioning

■ FOUR industries, now in their infancy, are destined to provide future generations with important manufacturing activity, and result in jobs for millions, W. S. Shipley, president, York Ice Machinery Corp., York, Pa., said in addressing a sales conference last week. These are air conditioning, diesel engines, television and aviation.

Branch managers and distributors were shown for the first time several new products developed by the company, including an oil-burner boiler for domestic heating or for use as part of a residential air-conditioning system; a portable air conditioner for residences and offices; three self-contained air conditioners for commercial uses; a new line of sectional air conditioners, and many refinements in existing equipment.

Addressing the conference also were S. E. Lauer, vice president and general sales manager; E. A. Kleinschmidt, vice president in charge of finance; Llewellyn Williams, chief engineer; S. H. Shipley, general works manager; J. L. Rosenmiller, sales promotion manager, and Walter Dorwin Teague, industrial designer.

York company executives expect air conditioning sales in 1938 will show a further increase over 1937 despite the current recession. Total sales of portable units are anticipated to reach 35,000 to 40,000 units. Sales of the York units alone, on which assembly-line production has just started, are expected to total 6000. It will sell for about $400.

Mr. Kleinschmidt stated that orders set a new high record last year at approximately $17,500,000, and that the company entered the new year with unfilled business of close to $2,500,000. Net profit for 1937 was about $1,000,000, after payment of $300,000 in taxes. Approximately 40 cents of every net dollar earned is paid out in taxes, he said. Business volume in 1929 was about the same as in 1937 but net profits were only half as large.

Reader Comments

(*Concluded from Page 7*)

govern the junior board, giving it autonomy. Elected were a president and secretary to be changed every three months, giving all juniors a chance to hold both offices, gain experience in running meetings by parliamentary laws, handling problems and fellow executives.

Board members gain wide practical knowledge by interchanging ideas, since all are from different departments; also poise and confidence. All new members for senior board vacancies are chosen from the younger group.

Board members retain their positions, move up, as long as they contribute new ideas at meetings, show that they are interested or step up to the senior board. Junior executives are hardest on fellow members, eliminate "dead weights" or "square pegs in round holes."

Junior suggestions passed unanimously are sent to the senior board for action, as youngsters can only advise. Much discussion and elimination of radical angles precedes passage of motions sent to senior board.

To date all junior board plans have been adopted and have helped account for McCormick & Co.'s steady increase in business of the past five years. A model grocery store suggested by the junior executives attracted thousands of grocerymen from all over the United States; redesigning of packages after housewife surveys has increased sales in certain lines. Business as a whole increased 16 per cent in one year.

Youthful junior executives have proven economical, ingenious, sound thinkers; leaders; recognized for their open-mindedness on business matters, their all-around knowledge of the business.

RICHARD T. PILLING JR.

Managing Editor,
McCormick Publications,
Baltimore.

Steel Index Is Ready

The index to Volume 101 STEEL, *for the last six months of* 1937, *now is ready for distribution. Copies will be sent to all subscribers requesting them.*

$8,400,000 for Research

■ United States Steel Corp. in 1937 spent $8,400,000 in 174 research laboratory departments.

Research and development work is supervised by Rufus E. Zimmerman, vice president in charge of metallurgy and research, and comprises 89 organizations in 64 laboratory buildings. If floor space occupied by all these laboratories were concentrated in one building, the structure would measure 50 x 200 feet and be 40 stories high.

Machinery Group For Competition

■ "AMERICA'S immediate major problem is to keep men at work and to restore to payrolls hundreds of thousands released in the last few months; threats of wage and hour legislation intensify the uncertainty largely responsible for the current recession," declared William J. Kelly, president, Machinery and Allied Products institute, Chicago, as the institute released a 24-page analysis of economic questions involved in federal wage-hour regulation. Stiffer competition and lower prices are needed, said Mr. Kelly.

"Interference with healthy competition must be fought regardless of its source, particularly when it takes the form of such uneconomic proposals as the Black-Connery wage and hour bill."

The institute cited figures to show real hourly earnings—wages in terms of purchasing power—in 25 manufacturing industries have increased 98 per cent since 1914.

"Progress such as this cannot be achieved by government compulsion. This is a concrete, obvious, measurable accomplishment of an unfettered economic system."

Cites NRA Failure

During the NRA period, it was pointed out, a 4 per cent increase in wage rates was more than nullified by a 10 per cent rise in living costs.

Eight weaknesses of federal wage-hour control are emphasized:

Adoption at any time would cause a major economic disturbance.

Varying conditions throughout the country make federal control undesirable and impractical.

It must of necessity be government of men rather than by laws—which in itself is a threat to democracy and an affinity of fascism.

It is a step toward abandonment of the competitive system.

Experience with NRA and proved economic facts have shown purchasing power cannot be created by legislation.

Distribution of national income better can be widened through the price angle, which affects all consumers, than from the wage angle, which grants benefits to some at expense of others equally in need and worthy of aid.

"Chiseling competition" cannot be eliminated by it because such legislation cannot reach or be enforced against the principal sources.

Higher social standards develop without government compulsion, as result of normal workings of an economy of free enterprise and individual initiative.

Grace Tells Employes Of Labor Situation

■ "It is both absurd and silly to suggest, as some do, that management gains any satisfaction from seeing productive facilities idle and employes without work," said E. G. Grace, president, Bethlehem Steel Corp., in a bulletin to employes.

"In simple terms, production at fair prices is the life-blood of the income from which wages are paid and profits are earned. On a construction program started in 1935 and now nearing completion, Bethlehem will have spent over $90,000,000, half of which was spent in 1937. It is evident that in our case neither capital nor our belief in American industry is or has been on strike."

Mr. Grace commented on the fact Bethlehem working forces reached an all-time peak of 107,000 in 1937 and now through the policy of work-sharing the company retains 35,000 more employes than would have been needed if a full time force had been kept on the job.

"Businesses like ours have grown and prospered because of an intimate contact and relationship between employes and management," Mr. Grace continued. "It will be a sorry day for this country if that relationship ever is permitted to be undermined.

"Everything in the Bethlehem situation is conducive to quick recovery. We have good labor relationships. We have plants that represent the last word in modernization. We have selling, research and metallurgical forces that are combing all the markets and studying new processes for possible developments of the business."

Four Mill Buildings To Be Erected in Middletown

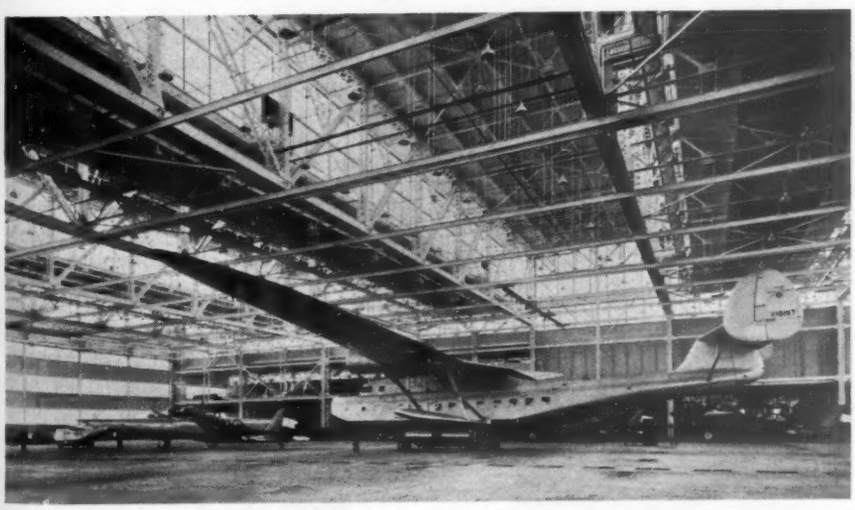
■ Construction of four parallel buildings, each 352 feet long, in expansion of American Rolling Mill Co.'s cold reduction mill at Middletown, O., was announced last week by Calvin Verity, executive vice president. Exclusive of equipment, the cost of expansion is estimated to be $620,000.

The buildings will house the temper rolling, processing, warehouse and shipping departments. Three will be wide enough to accommodate an 80-foot crane, while the fourth will be equipped with a 100-foot crane.

Since all are connected, total width of the structure will exceed 350 feet. F. H. McGraw Co., Middletown, has been awarded the contract and work is under way.

The company decided to go ahead with the construction work at this time to provide as much employment as possible.

135,000 Square Feet Without Columns



■ Records for flat roof spans in industrial building are claimed to have been broken in this new Glenn L. Martin Co. assembly plant in Baltimore. Roof trusses have 300-foot clear span, weigh 123 tons each. Height from floor to bottom of truss is 40 feet and the building has an area 300 x 450 feet without a single interior column.

Proportions of the structure are required for building large planes such as the Russian Clipper shown, with 165-foot wingspread and 94-foot nose-to-tail length. Ten such planes can be assembled in the building at one time. The Martin company foresees future planes which may be three or four times the size of the one shown. Albert Kahn Inc., Detroit, was architect for the building, recently completed.

Activities of Steel Users, Makers

■ JERSEY Shore Steel Co., Jersey Shore, Pa., has been organized to manufacture rerolled rails, reinforcing bars, angles and other steel products. The new company has acquired former steel erecting shops in Avis, Pa., and will spend about $200,000 for rehabilitation and improvement. Officers are: President, John A. Shultz, formerly president and plant superintendent of Sweet's Steel Co., Williamsport, Pa.; secretary-treasurer, John E. Spotts, previously secretary-treasurer of the Sweet's company; vice president and sales manager, S. C. Rebman, who formerly operated a plant in Danville, Pa. Production is expected to start April 1.

♦

Bucyrus-Erie Co., South Milwaukee, Wis., has removed its San Francisco offices from 989 Folsom street to 390 Bayshore boulevard.

♦

Westinghouse Electric & Mfg. Co. is moving its radio division from Chicopee Falls, Mass., to Baltimore, where it has purchased a modern manufacturing plant.

♦

J. M. & L. A. Osborn Co. held a sales conference in Cleveland Jan. 6-7, attended by all officers and salesmen in the Cleveland, Buffalo and Detroit divisions.

♦

Worthington Pump & Machinery Corp., Harrison, N. J., has acquired an interest in the Moore Steam Turbine Corp., Wellsville, N. Y. This adds to the Worthington products an extensive line of steam turbine equipment.

♦

Miami Metal Products Co. Inc., recently organized to manufacture steel window screens, has begun operations in its plant at 1820 Northwest First avenue, Miami, Fla. Carl Peavey is president and general manager, and Dr. Raymond Fisher, treasurer.

♦

W. S. Patterson Co., Appleton, Wis., has discontinued industrial, commercial and domestic plumbing and heating installations and is confining its efforts entirely to the sale of materials and to engineering problems in connection with these sales.

♦

Weirton Steel Co., Weirton, W. Va., has signed an agreement to make and sell "seal of quality" two-ounce coated galvanized sheets under the standard license issued by the American Zinc institute. This brings the number of "seal of quality" licensees to a total of 15.

MEN OF INDUSTRY

■ EARL L. RAYSOR has been named manager of steel mill sales, Shaw-Box Crane & Hoist division, Manning, Maxwell & Moore Inc., with headquarters at Pittsburgh. He was first employed by the company nine years ago as a sales engineer in the Youngstown, O., district and later in the Pittsburgh area. For the past two years Mr. Raysor has been Pittsburgh district sales manager, which position he still retains.

♦

E. V. Wenzell has joined the sales staff of Marshall & Huschart Machinery Co., Chicago.

♦

Charles E. Reichenbach has been elected an assistant treasurer of Pittsburgh Steel Co., Pittsburgh. He has been credit manager for many years and will continue to function in that capacity.

♦

Arthur T. Murray, who as noted in STEEL, Jan. 3, page 359, as having become associated with the Moore Drop Forging Corp., Springfield, Mass., has been named executive vice president of that corporation.

♦

Dave C. Forsman has terminated a four-year association with Sterling-French Machinery Co., Detroit, to become representative for the Colonial Broach Co. and Michigan Tool Co.

♦

E. A. Schwartz has been named open-hearth superintendent at the Brier Hill works, Youngstown Sheet & Tube Co., succeeding the late A. G. Egler. Mr. Schwartz formerly was assistant superintendent, and in the latter position he is succeeded by William Yeckley.

♦

H. L. Bills has been named director of personnel and industrial relations, Acme Steel Co., Chicago.

H. L. Bills

Earl L. Raysor

He will be located at the Riverdale works.

♦

Halvor O. Hem, chief engineer, Toledo Scale Co., Toledo, O., was awarded life membership in the American Society of Civil Engineers at a meeting of the Toledo section recently.

♦

Morris W. Zack has been elected president, M. W. Zack Metal Co., Detroit. Louis W. Zack has been made vice president and treasurer, and Mrs. Rose Granitz, secretary.

♦

A. B. Dougall, general sales manager, Electric Hose & Rubber Co., Wilmington, Del., has moved his headquarters to the company's new eastern sales office at 9 Rockefeller Plaza, New York.

♦

Harry I. Jacobs has withdrawn from Consolidated Iron & Steel Co., Newark, N. J., which will continue business under the ownership and direction of Joseph Dunsky and Jacob Ornstein.

♦

Frank L. Neward, Detroit, has been appointed representative in Michigan for the Gehnrich Corp., Long Island City, N. Y., manufacturer of industrial ovens and dryers, air heaters and accessory equipment, with headquarters in the Marquette building.

♦

W. L. Woody has been appointed manager of the Sharon, Pa., plant of National Malleable & Steel Castings Co., succeeding J. P. Kittredge, who will direct development of the company's wheel business. Mr. Woody formerly was manager of the Cleveland plant.

♦

James W. Rickey, chief hydraulic engineer, Aluminum Co. of America, Pittsburgh, since 1907, has resigned. He has been succeeded by James J. Growdon, who will also continue as consulting engineer of the hydraulic department.

♦

William Whigham Jr., heretofore superintendent of maintenance and industrial relations at Clairton, Pa., works of Carnegie-Illinois Steel Corp., has been named supervisor of personnel, methods and procedure department, with headquarters in Pittsburgh.

♦

Percy Cooke has retired as assistant secretary, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Cooke entered the steel industry in 1905 as a clerk with the former American Sheet & Tin Plate Co. He has been succeeded by John G. Patterson II, who joined Carnegie-Illinois as a clerk in the legal department in November, 1935.

♦

Mark Beeman has been appointed executive secretary, Concrete Reinforcing Steel institute, Chicago, succeeding the late R. W. Johnson. He was secretary of the institute from its organization in 1924 until 1933. Since the latter year he has been manager of the Washington office of the Portland Cement association.

♦

R. A. McCarty, since 1935 manager of the generator division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been made manager, small motor division, with headquarters in Lima, O. Mr. McCarty succeeds R. F. Frenger, who has returned to East Pittsburgh. F. H. Stohr succeeds Mr. McCarty in his former position.

♦

Abbott F. Riehle has been appointed sales manager of the Smootharc welder and welding electrode division of Harnischfeger Corp., Milwaukee. A graduate of the University of Pennsylvania, Mr. Riehle for ten years was in charge of sales and management, Riehle Brothers Testing Machine Co., Philadelphia, which later was taken

Abbott F. Riehle

over by American Machine & Metals Inc., where he continued in charge of sales.

♦

Henry C. Limbach, formerly with Fredericksen Co., Saginaw, Mich., has become associated with Riverside Foundry & Galvanizing Co., Kalamazoo, Mich., to direct sales and engineering of the nonferrous division. With his aid the company has developed a scientific process of making high lead bearing bronzes and is introducing them to the trade.

♦

H. Ross Belding and H. E. Beck have been appointed chief metallurgist and chief chemist, respectively, at Carnegie-Illinois Steel Corp.'s Farrell, Pa. works. Mr. Belding joined a subsidiary company of the United States Steel Corp. in 1922 and has been at the Gary, Ind., sheet and tin mills of Carnegie-Illinois since 1935. Mr. Beck's service with Carnegie-Illinois and the former Carnegie Steel Co. has been continuous since his appointment as assistant chief chemist of the Sharon, Pa., works in 1909.

♦

C. D. Henderson, since April, 1937, superintendent of industrial relations in the Chicago district for Carnegie-Illinois Steel Corp., has become assistant works auditor of Gary works. Mr. Henderson has been with United States Steel Corp. subsidiaries since 1906, beginning as a clerk at the LaBelle works of the former American Sheet & Tin Plate Co. He went to Gary tin mill in July, 1927, as assistant works auditor, and in 1935 was made management's representative there.

♦

C. H. Bliss, vice president and director of sales, Nash Motors division of Nash-Kelvinator Corp., Detroit, announces the following are now located in Detroit instead of Kenosha, Wis.; Courtney Johnson, general sales manager; J. E. Lamy, organization manager; A. C. Tiedemann, director of business management; A. F. Boscow, director of advertising and merchandising; E. J. Reeser, sales promotion manager; Fred C. Williams, assistant advertising manager; Claus Anderson, Canadian sales manager; W. C. Engel, manager, car order department; Harold Keck, manager, statistical department; George Geiselmann, assistant service manager, and Irvin Rapp, service and accessories department.

♦

Sam T. Keller has been appointed district sales manager, Yale & Towne Mfg. Co., Philadelphia division, in charge of activities in the Detroit, Toledo, O., and Grand Rapids, Mich., areas. Mr. Keller will maintain headquarters at 7310 Woodward avenue, Detroit, and will direct activities in the sale and service of Yale electric trucks, hand lift trucks and skid platforms. In recent years he has been a member of the sales staff of Chrysler Sales Corp.

Sam T. Keller

♦

W. C. Hood, assistant general superintendent, H. C. Frick Coke Co., has been advanced to general superintendent of the United States Coal & Coke Co., Kentucky and West Virginia operations, effective Jan. 16. Mr. Hood succeeds Harry M. Moses, president of these United States Steel Corp. subsidiaries, after serving 20 years in his former capacity with the Frick company. J. L. Sullivan, mine superintendent, has become assistant general superintendent, United States Coal & Coke Co., West Virginia division, headquarters at Gary, W. Va., and T. J. McFarland, mine inspector, has been made assistant general superintendent, United States Coal & Coke Co., Kentucky division, headquarters in Lynch, Ky.

R. H. Petillon

Who resigned as purchasing agent for Western Pipe & Steel Co., San Francisco, to become manager of the San Francisco branch of Ducommun Metals & Supply Co., as noted in STEEL, Jan. 10, page 22

DIED:

■ EMIL KELLER, 74, president, Standard Screw Products Co., Detroit, in that city, Jan. 7. Mr. Keller joined the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in 1886 and subsequently served as vice president and general manager of the Westinghouse Machine Co. In 1906 he organized the Detroit Insulated Wire Co. and also was associated with the Insulating Materials Co. and Metal Products Co.

♦

Henry F. Witgen, 57, purchasing agent and a director, W. Bingham Co., Cleveland, wholesale hardware firm, in that city, Jan. 10.

♦

Tine P. Dickinson, 49, secretary-treasurer and general manager, International Machine Tool Co., Indianapolis, in that city, Dec. 22.

♦

Harry S. Calvert, 65, vice president, Pfaudler Co., maker of enamel tanks, with plants in Elyria, O., and Rochester, N. Y., Jan. 5 in Elyria.

♦

Frank W. King, 65, formerly with the Valley Mold & Iron Co., Hubbard, O., at his home in Sebring, Fla., Jan. 7.

♦

W. W. Rosser, special sales representative for Iron & Steel Products Inc., Hegewisch, Ill., in Chicago, Dec. 22.

♦

David J. Wilkoff, 61, president of the Youngstown Steel Car Corp., Niles, O., and brother of the late Samuel Wilkoff, president of Wilkoff Co., Youngstown, O., in Youngstown, Jan. 7.

♦

Frederick J. Riebel, 58, for many years associated with the Standard Sanitary Mfg. Co., Jan. 4, in Pittsburgh. He served in executive capacities in the purchasing department until ten years ago when he retired.

♦

James C. Bennett, 68, who retired in 1934 from the vice presidency of Westinghouse Electric & Mfg. Co., Jan. 4, in Stamford, Conn. He was connected with Westinghouse from 1886 until his retirement.

♦

John A. Capp, 67, engineer of materials in the General Electric works laboratory at Schenectady, N. Y., in that city, Jan. 6. A veteran of more than 45 years' service with the company, Mr. Capp formed the testing laboratory and was its chief until it was merged with the Schenectady works laboratory in 1927.

DIAMONDS

A GOOD INVESTMENT

The value of diamonds lies not alone in their size, but in their quality, their perfection, and their cutting. Time has proved their unapproachable investment value.

Similarly, the value of machine tools lies in their quality, their perfection, and too, their cutting. It remains but to put machines to work to determine their practical value.

The Investment Value of Bullard Mult-Au-Matics has been proved by Time and unapproachable values established.

Therefore, what these machines can do for others, they can also do for You.

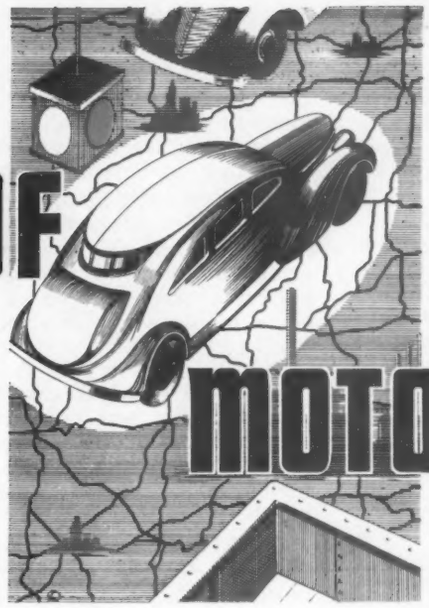
SAVE WITH MULT-AU-MATICS

HAVE BULLARD ENGINEERS ESTIMATE TIME SAVING ON YOUR WORK

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

MIRRORS OF MOTORDOM



BY A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ SHAKING off its holiday lethargy, the automobile industry made definite progress last week on a return to normalcy as thousands of workmen, idle since Christmas, filed back to jobs on a three and four-day week basis. Chrysler plants Tuesday absorbed about 55,000. Hudson re-employment proceeded slowly, while Ford reports this week about 45,000 will be recalled as manufacture of some parts and subassemblies resumes.

Chrysler has scheduled about 2000 assemblies for the balance of the month; Plymouth 16,000, Dodge 9000, these figures for Detroit only. Total Chrysler plants production for January probably will aggregate 30,000 units. Last year, in one week the corporation turned out over 27,000 cars.

General Motors assemblies for January will total approximately 90,000, while Ford will account for somewhere near the same total unless a rumored shutdown this week materializes.

Produce Standard Cadillac

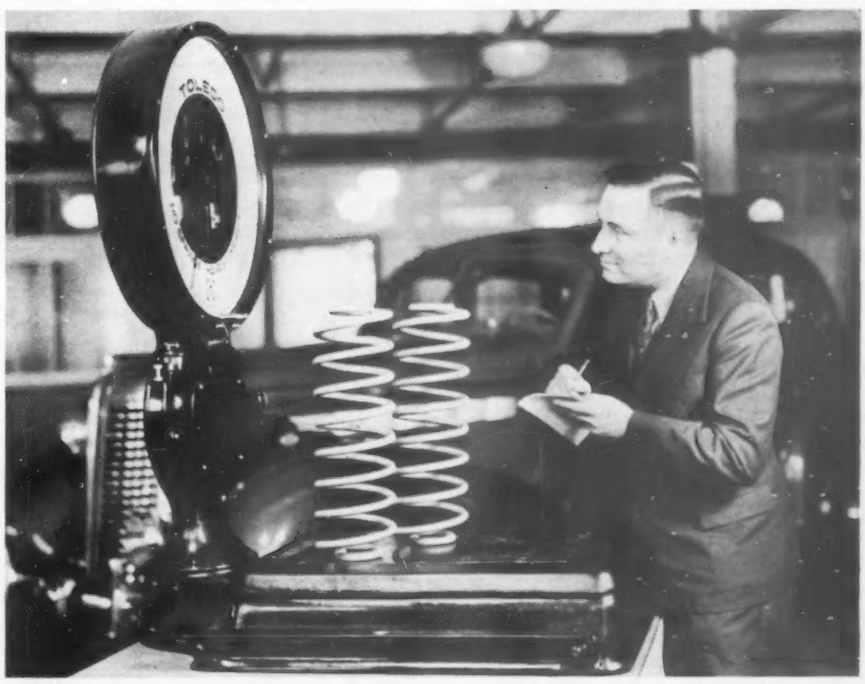
Cadillac has placed its standard V-8 model in production. This line, noted in STEEL for Oct. 18, will be priced about $400 under the Cadillac base price and is designed to enter a price group immediately above the LaSalle.

Steel buying is gaining slowly, and although automobile manufacturers have not re-entered the market to any extent, there has been an appreciable improvement in purchases by parts manufacturers and other small industries in this area. Buying is still on a hand-to-mouth basis, necessitated by the depletion of material inventories and should show some acceleration in coming weeks.

Great Lakes Steel Corp. here, after experiencing two weeks with all open hearths down, relighted four a week ago as a result of a small backlog of accumulated orders. Work has been slowed on the four new open hearths which this company is building. It was originally planned to have these new units in operation by Jan. 1, but at present only one furnace has been completed. Mountainous piles of scrap adjacent to the Great Lakes open hearths indicate ample scrap protection at the present rate of operations, but with 16 furnaces melting, this supply would not last long.

■ A QUIET but determined campaign for a build-up of public opinion for Henry Ford apparently is under way. Astute public relations experts of the company no doubt

New Buick Springs Weigh Less



■ **Set of coil springs for Buick's new rear suspension system weighs 45.94 pounds compared with 107.01 pounds for last year's conventional spring assembly, a saving materially affecting unsprung weight of the car. Noting the weight here is Vern Mathews, chief of the chassis division of the engineering department. With the new suspension, ratio of rear unsprung weight to total car weight is only 9.9 per cent**

have correctly recognized that ultimately the outcome of the dispute between the national labor relations board and Ford rests with public opinion. Hence the avenues of information on what Ford is doing and has done are being cleared.

Interviews with Mr. Ford are always good front-page material as shown by recent publication of such articles by two national press services. Alliance of agriculture with industry appeared to be the keynote of Mr. Ford's comments in both of these interviews which, incidentally, tipped off Ford's plans for a new tractor to be made at the Rouge plant.

Release of information on the new Ford tractor caught some Ford people unawares, and privately they were a little disturbed over the premature publicity on the project, since it may be some months before the device is in production. Mr. Ford indicated the tractor would sell for under $375, that he would make every effort to get it into the hands of farmers even if he realized no profit. Other implement manufacturers probably read this declaration with interest.

Design is a radical departure from present tractors, with one large cleated wheel, a small front steering wheel and a third offset rear wheel, engine being mounted between the latter and the cleated wheel. Ford stated other manufacturers would be licensed to build the tractor, buy the engine from him.

One of the chief difficulties with tractors is the matter of tipping. If Ford has solved this trouble, he may be able to drive an important wedge into the farm implement field. The Graham rubber-tired tractor, being built for a large mail-order house, has not set any sales records as yet, although it is reported to be a capable performer.

Information on a new Japanese tractor priced at around $300 and designed for the American agricultural market is being passed around.

■ FORD'S comments on the use of plastics derived from agricultural products, his reference to the superior qualities of a sheet of plastic over a sheet of steel drew a laugh in steel circles here. No steel supplier has started to worry yet about the replacement of sheet and strip steel by plastics in automobile bodies. The incident recalled recent proposals to fabricate fenders of molded rubber.

But Ford may have the last laugh because there is right now in Detroit pretty good basis for the guess that it may not be long before you will see a Ford car with molded plastic fenders. The saving in cost over steel fenders which must be stamped, trimmed, ground, rust-proofed and painted, is pointed out. The plastic requires only one hot molding operation in which the shape, color and finish are brought out with a single stroke of the press.

Such a change would be of revolutionary proportions, but typical of Ford technique. Considerable development work is still needed to perfect a press capable of turning out a molding of this size. One of the largest plastic moldings made in recent years is the scale housing used by Toledo Scale Co. in one of its models, but here the maximum dimension is not over 18 inches, and it required a 22-foot high 1500-ton press with nine hydraulic rams.

Speaking of fenders, Buick has awarded fender dies for its 1939 models within the past two weeks and is now contacting local tool and die shops to determine how much of the 1939 Buick program these shops are equipped to handle. Other builders also are in process of lining up sources for 1939 dies and next year gives promise of one of the largest tool and die programs in the history of the industry. In general, die suppliers here have little business at present; some of them were active on some Chrysler work in the last month or so, but this has been cleaned up and they are eagerly awaiting release of new model programs. Chrysler die work as yet has not made its appearance on finished cars, and it is possible that revisions were killed by the management.

Closed meeting of over 1000 Chrysler field men was held here last Tuesday. No reports of the proceedings were made public, but a source close to the company is credited with the statement, "You haven't heard anything yet," obviously referring to Hudson's invasion of the low-price field with its new 112 model.

Graham will resume assemblies this week, after a two-week shutdown. Suspension of operations by Graham is understood to have resulted from the management's preference to work the plant full time during the last half of the month instead of only part time during the full month. Until the recent closing, Graham had turned out about 3760 of its 1938 models since the start of assemblies last October.

■ LINCOLN-ZEPHYR sold more cars last December than in December of 1936—2201 compared with 2125 a year ago. Production in January has been stepped up 15 per cent over the December rate and is currently running about 750 weekly. Export sales, in common with nearly all producers, are holding up well, and shipments abroad this month will exceed any previous month.

Hupmobile is offering as optional equipment an air conditioning unit built by Evans Products Co. here. It introduces from 100 to 150 cubic feet of filtered, heated and dehumidified air per minute at average speeds. In summer, the heating unit is disconnected, but the balance of the system continues to function.

To reduce the penalty of high freight rates and heavy duties, Willys is planning to arrange for assembly operations in a number of European countries, as well as in South America and South Africa.

Covered Wagon Co., Mt. Clemens, Mich., has announced a new line of trailers at prices approximately $200 under former models. Leatherette exteriors replace steel-faced plywood. Roof and sidewalls are insulated with spun glass.

Ford publicists note the company has used 83,100 different types of gages since the first days of model T manufacture, and there are from 1 to 150 of each type.

In a statement to stockholders, Alfred P. Sloan Jr. of General Motors, notes car prices per pound have been reduced 45 per cent from 1925, while at the same time hourly wage rates were increased 18 per cent above 1925. Discussing efforts to regularize employment, Mr. Sloan stated General Motors two years ago set up a revolving fund of $60,000,000 to build up inventory in periods of low seasonal consumer demand and thus maintain employment.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

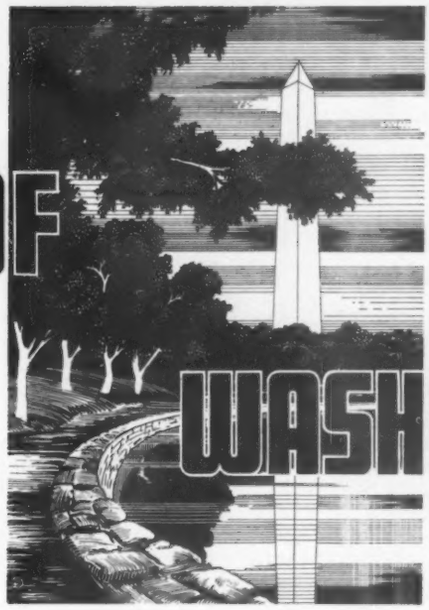
	1935	1936	1937
Jan.	300,335	377,244	399,634
Feb.	350,346	300,810	383,698
March	447,894	438,943	519,177
April	477,059	527,625	553,415
May	381,809	480,518	540,357
June	372,085	469,368	521,139
July	345,297	451,206	456,909
Aug.	245,075	275,934	405,064
Sept.	92,728	139,820	175,620
Oct.	280,316	230,049	337,979
Nov.	408,550	405,799	376,637
11 mos.	3,701,494	4,097,316	4,669,629
Dec.	418,317	518,958	.....
Year	4,119,811	4,616,274	.....

Estimated by *Ward's Automotive Reports*

Week ended	
Dec. 18	82,025
Dec. 25	67,230
Jan. 1	49,550
Jan. 8	54,084
Jan. 15	65,735

	Week ended Jan. 15	Jan. 8
General Motors	22,160	22,425
Chrysler	13,975	2,750
Ford	22,765	22,765
All others	6,835	6,144

WINDOWS OF WASHINGTON



BY L. M. LAMM

Washington Editor, STEEL

WASHINGTON

■ WASHINGTON newsmen are at a loss to account for the actions of the President in the conferences which he has had and intends to have with industrial leaders.

The greatest surprise was evidenced last week when Mr. Roosevelt conferred with E. T. Weir, chairman, National Steel Corp., Alfred P. Sloan, chairman, General Motors Corp., Lewis Brown, president, Johns-Manville Co., M. W. Clement, president, Pennsylvania railroad, Colby Chester, chairman, National Manufacturers association.

A noncommittal press notice was issued following the conference. It is interesting to note that Donald R. Richberg, former NRA head, also sat in with the President in the conference. It may be recalled that mention was made last week that Richberg and James Roosevelt are both making an effort to bring the administration more into line with industry.

The President always has had a soft spot in his heart for the NRA. Yet newsmen were surprised when, at a recent White House conference, he suggested that industrial chieftains should sit down with the government experts to chart probable demand, purchasing power, production and inventories.

Relax Antitrust Laws?

This statement came on the heels of some of the more recent utterances from the department of justice and were more or less a surprise to the left wing of his followers. His words really only added to the general confusion on the whole business question.

Mr. Roosevelt is seeing a number of industrialists both on and off the record and has been for the last two or three weeks. This week, Jan. 19, the President will see the members of Secretary Roper's business advisory council and there is the greatest amount of speculation as to what, if anything, will come of it.

If Mr. Roosevelt's latest suggestions prevail, namely, to have the industrialists work out their own salvation as well as the whole big business picture, the federal antitrust laws in all probability, would have to be relaxed, as they were during the NRA regime.

At the press conference referred to the President conceded many persons believe the course of action he had suggested would violate the antitrust laws. But, he said, he regarded such action as perfectly legitimate as long as it was done without resort to price fixing or steps to drive competitors out of business.

ROPER COUNCIL FEELS ITSELF SHORT CIRCUITED

Secretary Roper's business advisory council was surprised when the President called upon industrial leaders to make suggestions for business co-operation.

The Roper council thought that it was going to be in on the ground floor at these talks but evidently not.

It is time that the Roper council chose its chairman for the coming year. There is a story back of that now, however. W. A. Harriman is present chairman and, while officials are not talking about it, there is every evidence that he will be allowed to retain the chairmanship, since he is *persona grata* at the White House.

It is said that election of chairman has been changed from January until July. The story is that the council feels that the chairmanship should not be changed while congress is in session. However, that is apparently just an excuse because ever since the council was started at the beginning of the administration the chairman has changed whether congress was in session or not. Considerable interest attaches to the meeting between the council and the President this week.

SUBSIDY AGREEMENTS MADE FOR 20 TO 43 NEW SHIPS

The United States maritime commission has announced commitments of seven shipping companies to build 20 to 43 ships for foreign trade between now and 1942 in the government's program to rehabilitate the American merchant marine.

Under the agreements, the seven shipping companies will receive annual operating subsidies totaling $7,359,000, of which 57 per cent is represented by wages and subsistence of officers and crews.

The seven lines with which long term subsidy agreements have been definitely concluded have agreed, it is understood, to build 20 ships between now and 1942, with 14 of them to be started in 1938, and in addition, the commission is requiring the companies to develop plans for constructing 23 more ships.

The Export Steamship Corp., New York, which is now endeavoring to negotiate a long term subsidy, is prepared to build 9 or 10 ships in the event a satisfactory arrangement is worked out. The cost of building these 53 vessels would be approximattely $110,000,000.

The terms of the subsidy agreements provide for automatic cancellation and a return of 25 per cent of the subsidy in the event that construction is not undertaken according to schedule.

It also is stated that if the companies with which short term sub-

sidy agreements have been made pending further study of their problems, qualify for long term subsidies, it will result in construction by this group of at least 10 additional vessels, bringing the total to 63 or 64.

TAX RELIEF BILL STARTS PROGRESS THROUGH HOUSE

After months of consideration by a subcommittee of the house ways and means committee, the full membership began public hearings late last week on tax relief.

As is usual, the early witnesses were from the treasury department to lay the ground work for the bill. These treasury experts are those who have worked with the subcommittee in framing what has already been worked out. The story is that in forming the new program the committee has followed the suggestions of the President that they were not to reduce aggregate federal collections.

FAIRLESS TO TESTIFY ON UNEMPLOYMENT THIS WEEK

Walter S. Tower, of the American Iron and Steel institute, and Benjamin F. Fairless, United States Steel Corp., who were to have testified before the special senatorial committee in connection with the unemployment situation last Friday are now slated to appear before the committee Jan. 19.

HEARINGS SET FOR UNITED KINGDOM TRADE AGREEMENT

Hearing will be held here March 14, it was announced last week, in connection with the trade agreement with the government of the United Kingdom. The state department has announced Feb. 19 will be the closing date on which applications to be heard will be received.

Included in the list of products on which the United States will consider granting concessions to the United Kingdom are: Pig iron, manganese ore, tungsten metal, steel ingots, iron or steel sheets or plates, sashes or frames of iron or steel, wire rope, castings of malleable iron, etc.

As is well known, there have been a good many conversations with the British over this proposed agreement, but it will still be some time before the agreement can be finally consummated. As stated above it will be March 14 before the committee for reciprocity information hears American manufacturers and it will then still be some time before all of the information can be tabulated into usable form. Government officials are looking forward to completing this agreement because it is considered the most important agreement undertaken since the inauguration of the trade program under the present administration.

The state department has also made public the fact that it is to negotiate a trade agreement with Turkey. A public hearing on this subject will be held Feb. 23, at which time American manufacturers who are interested may present their case.

In 1934 the United States exported 33,447 tons of steel to Turkey, while in 1936 the exports dropped to 22,132 tons but during the first eleven months of 1937 there was a recovery to 32,934 tons.

In announcing negotiations with Turkey the American government is making an attack on Germany's bartering arrangement with Turkey which led in 1936 to Germany's having sent 45 per cent of the latter's imports and absorbed 51 per cent of Turkey's exports.

MANY WORKING PART TIME WANT MORE EMPLOYMENT

John D. Biggers, administrator of the national unemployment census, is beginning to issue more detailed information about the unemployment figures. He says that persons who registered as partly employed and wanting more work numbered 3,209,211.

Of this number 2,641,680 were males. The middle Atlantic states, including New York, New Jersey and Pennsylvania, had the largest number of partly unemployed, totaling 715,158. New York had the highest state total of partly employed who wanted more work, amounting to 319,566.

Mr. Biggers said that "questions regarding partial unemployment were included on the voluntary registration card, as provided by law, but with full realization of the impracticability of accurately measuring such a variable quantity."

NAVY MACHINE TOOL SITUATION NOT IMPROVED

Two years ago the navy department made a strong plea for new machine tools to make modern, to some helpful degree, the equipment in navy yards. At that time it was urgently recommended that $2,500,000 each year for five years be allotted for a machine tool replacement program. The average equipment age of 19 years at that time made manufacture and repair an exceedingly costly proposition, far above the expenditures which would be necessary if yards were equipped with up-to-date machines.

An attempt was made to obtain $24,663,880 from the FERA, which, if spent for machine tools, would have reduced the average equipment age to 10 years.

How inadequate outlay is can easily be realized by this hypothetical illustration: If the navy were given enough money to bring the average age of its machine tools in the navy yards down to 10 years, it would still take a regular outlay of $1,942,000 a year to pension old equipment when it reached the venerable age of 20 years. This estimate is distinctly on the conservative side, since it leaves out of consideration certain equipment in the navy yards put in operation in the last three years, which also would have to be replaced at 20-year intervals.

LABOR RELATIONS DECISION ADVERSE TO AMALGAMATED

The national labor relations board has announced that it has dismissed a petition for investigation and certification of representatives of employes of the Greer Steel Co., Dover, O. The board's action was based on the fact that the union failed to poll a majority vote in an election held Dec. 13.

In its decision the board said: "The results of the secret ballot show that no collective bargaining representatives have been selected by a majority of the employes of the company in the appropriate unit. We will accordingly dismiss the petition for investigation and certification filed by the Amalgamated Association of Iron, Steel and Tin Workers."

FREIGHT RATE DECISION EXPECTED IN FEBRUARY

Final hearings will be held in Washington beginning Jan. 17 before the interstate commerce commission in connection with the 15 per cent freight rate increase case.

As soon as the actual hearings are completed the commission will hear final argument. It is therefore felt by those who know something about the situation that before the end of this month the complete case will be before the commission. While it would be most unusual there is some talk here that a final decision might possibly be handed down in the third or fourth week of February.

CENSUS OF MANUFACTURES STARTS THIS MONTH

The biennial census of manufactures for 1937 gets under way Jan. 28, when schedules will be mailed to manufacturers, according to the bureau of the census.

At the 1935 census of manufactures 6441 establishments were engaged in manufacturing iron and steel and their products. Machinery manufacturers are not included in this group. These establishments had 93,631 salaried employes and 775,905 wage earners, with salaries amounting to $211,039,016 and wages totaling $877,925,648. Products valued at $4,265,327,155 were manufactured by these establishments.

Industry Ready To Create New Jobs if Obstacles Are Removed

FOR many years one of the country's leading merchants in ferromanganese, pig iron, and related commodities, the late Dudley Fairfax Bush, also was a raconteur of parts. His friends took delight in encouraging him to reminisce, particularly on his boyhood experiences as a member of a family "as poor as Job's turkey."

It happened that the Morgan and Bush families had neighboring farms and that J. Pierpont Morgan had become a power in the banking world. So when young Bush in his late 'teens felt the prickings of ambition, his thoughts turned to Mr. Morgan.

He managed to get together enough money to finance a trip to New York. There Mr. Morgan found opportunity for him in the form of a job and the young man began his march to fame and fortune.

Capitalist Has Duty To Provide New Opportunities; Broad Field Exists for Expanding Activities

The boys of a generation ago were taught that the best way to get ahead in the world was to enlist the interest of a rich man who needed dependable men to do jobs of diversified character. Given the opportunity, it was up to the boy to carve out a career for himself.

In those days the rich man was a highly respected citizen and his authority was great. Today his status is vastly changed. This is because he was unable, during the depression years, to perform his usual function of providing jobs and opportunities. Only by reassuming the responsibility of providing employment can he regain his former prestige.

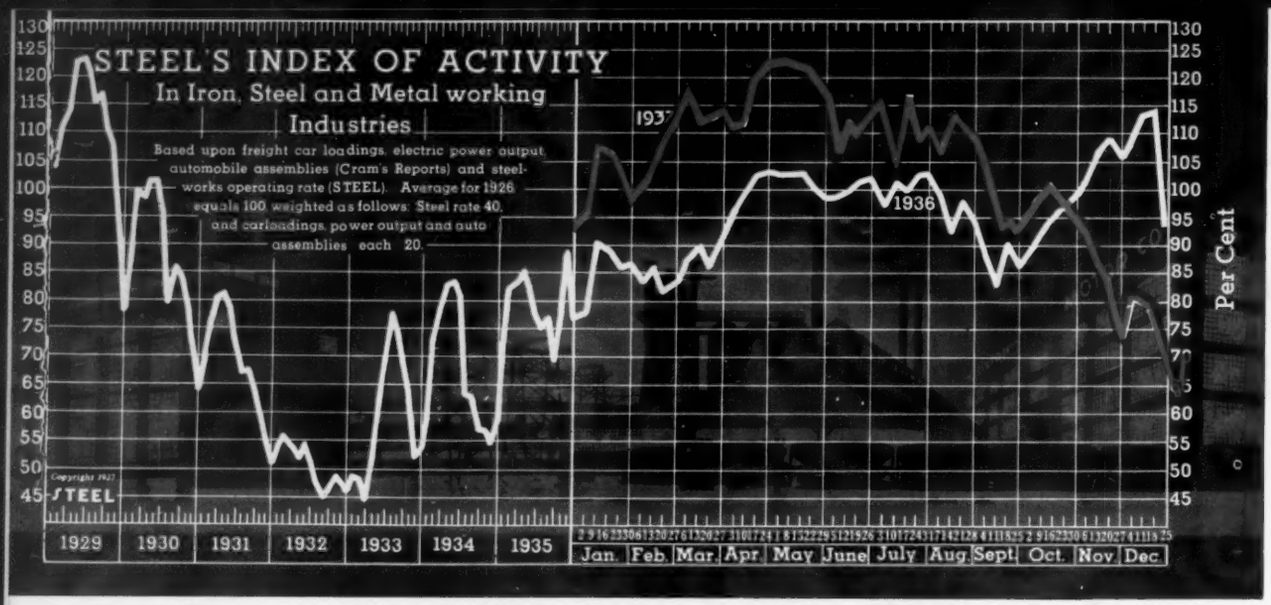
The rich man—and this term must be construed as embracing employers and capitalists— is under great handicaps at this time. It would be a mistake, however, to assume that these are insuperable.

The fact remains that millions of new jobs can be created. Never before have there been opportunities for setting up new industries on a broader scale than at present. Research work is better organized than ever before and is evolving the germs for many new industries. All that is necessary is to remove the obstacles which now prevent the free functioning of capital.

Removal of Deterring Factors up to Legislators; Voters Should Be Educated for Constructive Action

To remove these obstacles it is necessary that the public be enlightened to the full import of the vicious and ridiculous notions responsible for much of our present oppressive legislation. If the voters understand the true place of industry in the national pattern they will elect represenatives more inclined to replace destructive with constructive action.

This educational task is a big one. But the men who developed industry in this country to its present level are fully capable of organizing to accomplish it. They can do the job if they will. And if they fail to take effective action it will be to their ultimate sorrow.


STEEL'S INDEX OF ACTIVITY
In Iron, Steel and Metal working Industries
Based upon freight car loadings, electric power output, automobile assemblies (Cram's Reports) and steelworks operating rate (STEEL). Average for 1926 equals 100, weighted as follows: Steel rate 40, and carloadings, power output and auto assemblies each 20.
1937
1936
Per Cent
1929 1930 1931 1932 1933 1934 1935
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
STEEL

STEEL'S index of activity increased 7.6 points to 70.3 in the week ending Jan. 8:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
Nov. 6	82.4	102.1	88.4	54.9	50.7	48.5	56.0	71.5
Nov. 13	86.5	107.9	88.8	55.2	52.6	47.7	55.5	73.0
Nov. 20	84.9	109.9	90.9	54.4	55.4	49.2	54.8	71.0
Nov. 27	72.7	105.2	86.0	51.9	49.7	47.5	54.4	66.9
Dec. 4	81.5	108.4	91.7	56.8	52.6	45.3	52.9	69.2
Dec. 11	80.5	113.9	91.8	60.6	56.0	46.6	53.1	68.2
Dec. 18	79.4	114.8	91.9	64.4	58.0	46.9	52.3	67.3
Dec. 25	69.5	93.3	77.3	60.8	53.7	42.9	46.8	52.3
	1938	**1937**	**1936**	**1935**	**1934**	**1933**	**1932**	**1931**
Jan. 1	62.7†	96.6	78.2	65.4	53.6	45.3	48.8	58.5
Jan. 8	70.3*	107.8	90.2	73.8	58.1	48.6	55.8	69.2

*Preliminary. †Revised.

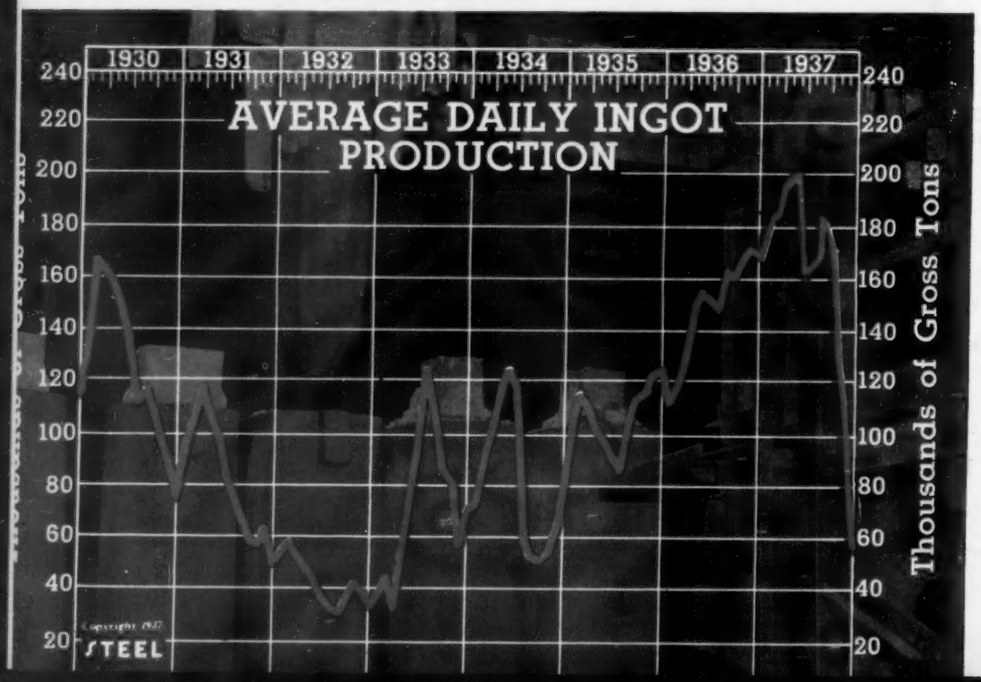
Industrial Activity Is Recovering Slowly

MODERATE gains in all four barometers lifted STEEL'S index of activity in the iron, steel and metalworking industries to 70.3 for the week ending Jan. 8. This compares with 69.5 in the week ending Dec. 25 and 62.7 in the week ending Jan. 1. The recovery falls short of restoring the index to the level of 79.4, which prevailed in the week ending Dec. 18—the last week of 1937 unaffected by holiday interruptions.

However, indications point to the likelihood that activity in the next week will completely restore the losses of the year-end holiday period. Automobile production is on the mend. The steel rate is working upward slowly. Electric power output already has moved into the 2,100,000,000 kilowatt-hour bracket. Car loadings, still midway between the 500,000 and 600,000-car levels, are pointed upward.

Another factor to be considered is a series of advances in nonferrous metal prices. This movement confirms the significance of interruptions to the downward trend in some commodity prices discernible in mid-December.

Signs that a tide of increasing cheerfulness is exerting a beneficial psychological influence upon business are multiplying. A ground swell of renewed confidence is developing.

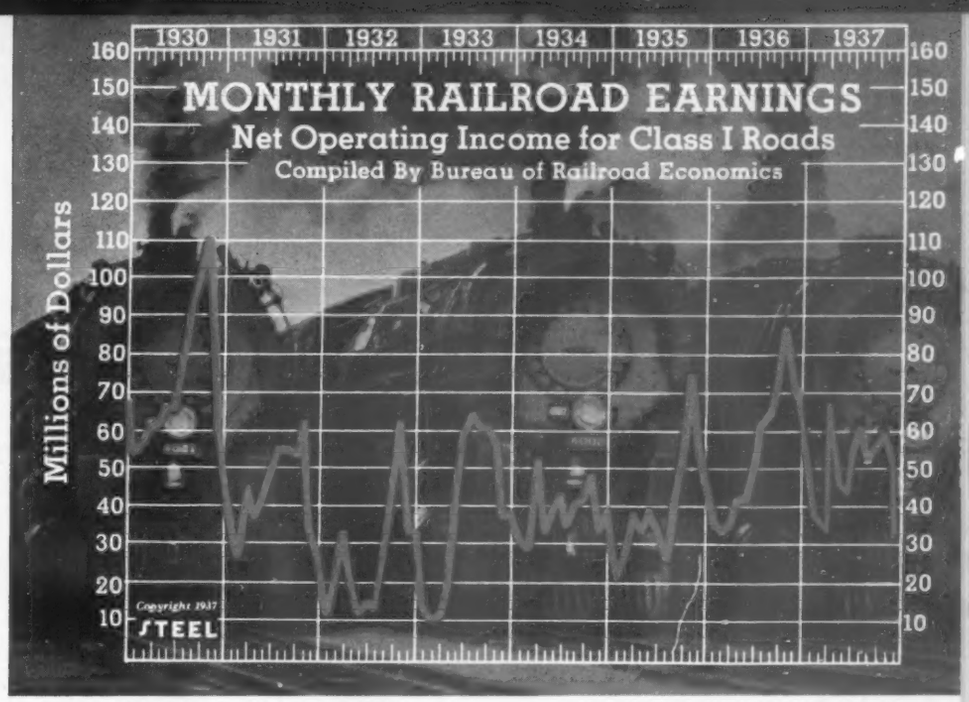


	Gross Tons		
	1937	**1936**	**1935**
Jan.	182,181	112,813	106,302
Feb.	184,361	118,577	115,595
March	193,209	128,576	110,204
April	195,072	151,625	101,562
May	198,213	155,625	97,543
June	160,914	153,263	90,347
July	168,763	150,874	87,224
Aug.	186,992	161,351	1079,97
Sept.	172,075	160,043	113,000
Oct.	130,488	168,333	116,398
Nov.	86,151	173,496	121,170
Dec.	56,625	170,448	122,936

BUSINESS TREND

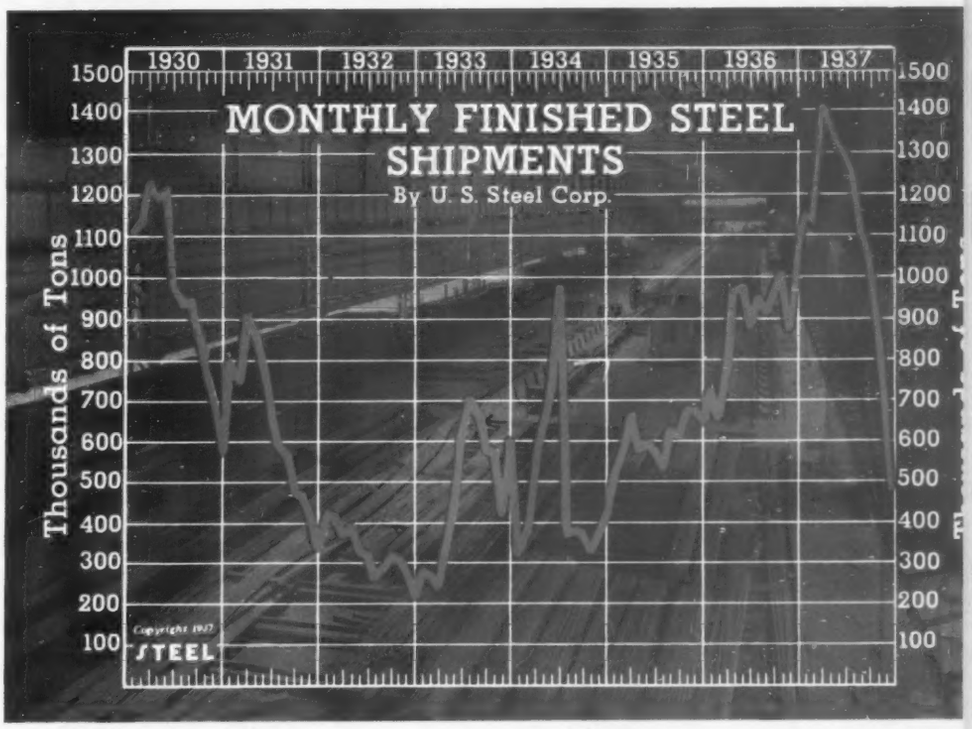
Railroads Earn 2.31 Per Cent On Investment in November

	1937	1936	1935
Jan....	$38,436,679	$35,728,532	$21,934,645
Feb....	38,358,638	33,594,718	26,296,411
March.	69,379,328	35,205,513	38,129,871
April..	47,807,447	41,493,455	34,708,718
May...	43,662,959	41,797,047	39,598,511
June .	58,939,875	50,312,580	34,102,703
July...	60,527,576	61,773,765	26,919,343
Aug...	50,307,881	64,680,717	42,156,706
Sept...	59,304,948	70,096,166	57,349,265
Oct....	60,747,445	89,809,372	75,454,501
Nov...	32,440,920	72,376,522	54,224,290
Dec....	.....	70,519,601	46,020,695


MONTHLY RAILROAD EARNINGS
Net Operating Income for Class I Roads
Compiled By Bureau of Railroad Economics
Millions of Dollars
1930 1931 1932 1933 1934 1935 1936 1937
Copyright 1937 STEEL

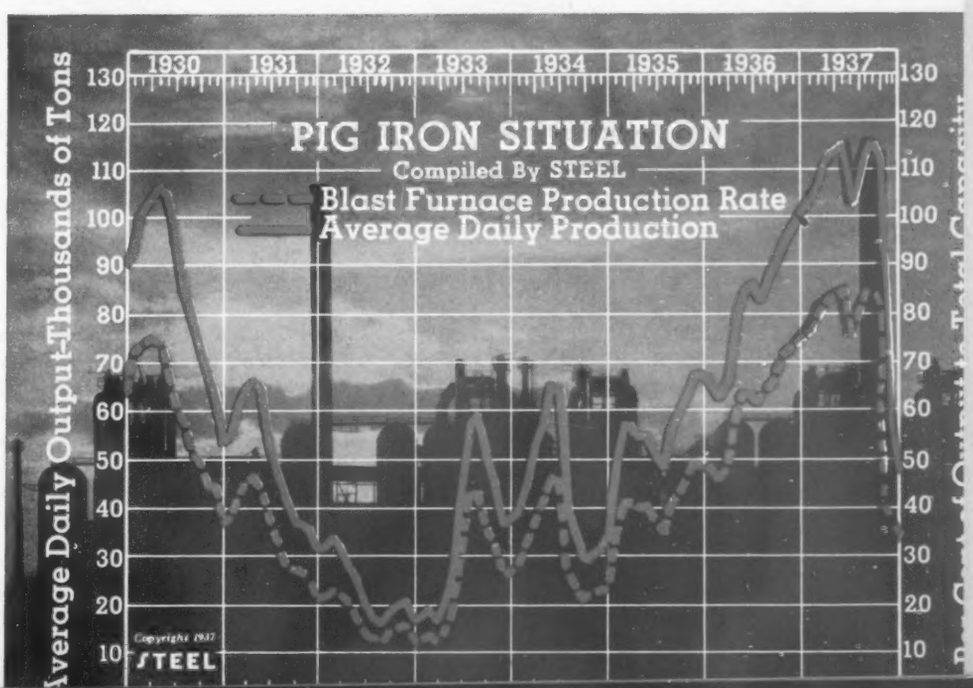
Steel Shipments Decline Sharply in December

	Gross Tons		
	1937	1936	1935
Jan.....	1,149,918	721,414	534,055
Feb.....	1,133,724	676,315	583,137
March.....	1,414,399	783,552	668,056
April.....	1,343,644	979,907	591,728
May.....	1,304,039	984,087	598,915
June	1,268,550	886,065	578,108
July	1,186,752	950,851	547,794
Aug.	1,107,858	923,703	624,497
Sept.	1,047,962	961,803	614,933
Oct.	792,310	1,007,417	686,741
Nov.....	587,241	882,643	681,820
Dec.....	489,070	1,067,365	661,365


MONTHLY FINISHED STEEL SHIPMENTS
By U. S. Steel Corp.
Thousands of Tons
1930 1931 1932 1933 1934 1935 1936 1937
Copyright 1937 STEEL

December Iron Output Down 13.5 Per Cent

	Daily Average, Tons		Blast Furnace Rate, Per Cent	
	1937	1936	1937	1936
Jan.....	103,863	65,461	76.6	48.2
Feb.....	107,857	63,411	79.5	46.6
March...	111,951	66,004	82.5	48.5
April ..	113,354	80,316	83.7	59.1
May ...	114,360	85,795	84.3	63.1
June ...	103,843	86,551	76.6	63.6
July ...	112,947	83,735	82.9	61.5
Aug.....	116,676	87,475	85.7	64.3
Sept. ...	113,937	90,942	83.7	66.9
Oct. ...	93,259	96,509	68.4	71.0
Nov.....	66,925	98,331	49.1	72.3
Dec.....	48,499	100,813	35.6	74.2


PIG IRON SITUATION
Compiled By STEEL
Blast Furnace Production Rate
Average Daily Production
Average Daily Output-Thousands of Tons
1930 1931 1932 1933 1934 1935 1936 1937
Copyright 1937 STEEL

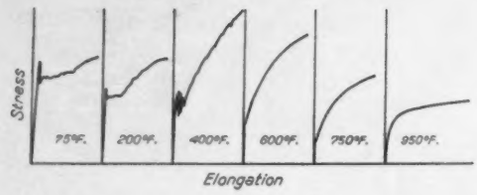


Fig. 1

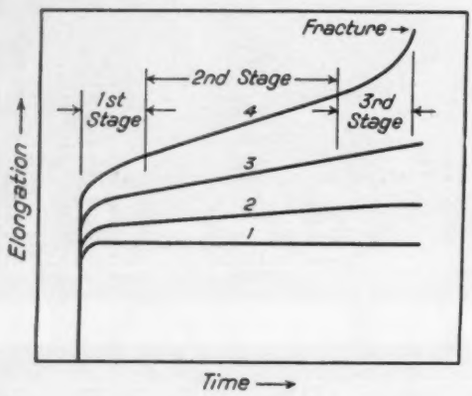


Fig. 2

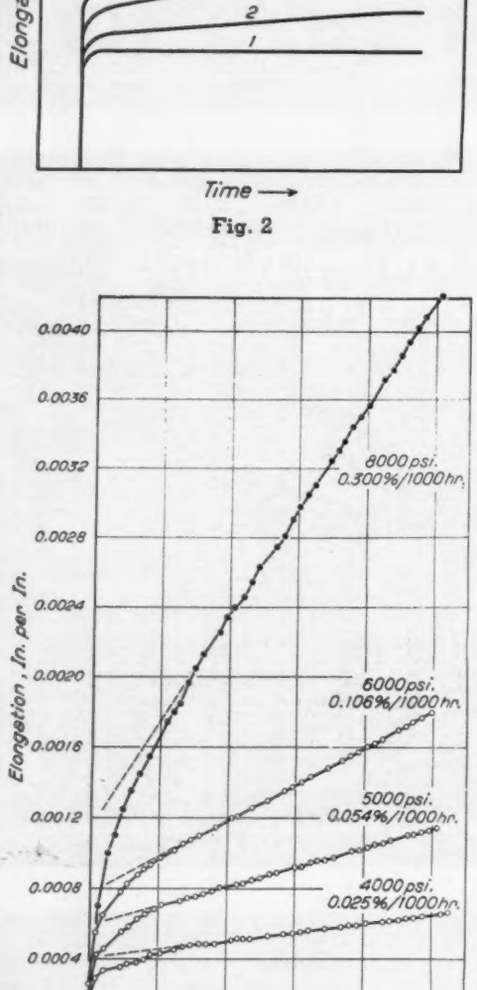


Fig. 3

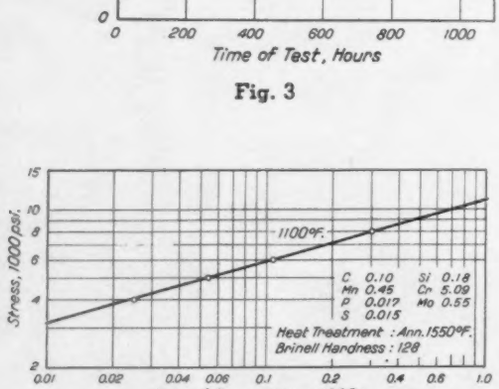


Fig. 4

Selection of Steels fo

By MARTIN FLEISHMANN
Metallurgical Engineer,
Steel and Tube division,
Timken Roller Bearing Co.
Canton, O.

■ THE PROBLEM of selecting economical steels for use at high temperatures requires not only a knowledge of the strength and stability of the materials under stress at high temperatures, but is intimately linked up with the resistance of these steels to corrosion and oxidation.

While standard tensile tests of steels furnish reliable data to the engineer on which to base the design of construction for use at normal temperatures, the testing of steels at elevated temperatures presents an extremely complex picture which has made standardization difficult and produced data which in many cases reveal an apparent lack of agreement between different laboratories. The behavior of a low carbon steel at increasing temperatures is graphically indicated in the stress-strain diagrams of Fig. 1. At room temperature all types of steel may practically be considered elastic bodies, if stressed below their proportional limit. A stress applied will result in a definite elongation and regardless of the length of time this load is maintained, the deformation will remain constant.

At elevated temperatures steels lose their elastic behavior and become distinctly plastic. This condition is schematically indicated in Fig. 2. This sketch shows that a load applied at elevated temperature results in an initial deformation, but unlike the condition at room temperature, this deformation continues with the time of load application. This increase in the elongation of metallic materials with time under a constant stress is what is more commonly known as "creep." Curve No. 4 indicates the three stages of creep. In the first stage creep occurs at decreasing rate; in the second, at an approximately constant rate; and in the third and final stage, at an increasing creep rate. Present time creep data are usually obtained at loads and temperatures which will produce curves similar to No. 2 and No. 3. The third stage of creep is not entered.

Fig. 1—Typical stress-strain curves at increasing temperatures. Fig. 2—Curves indicating the three stages of creep. Fig. 3—Time-elongation curves at 1100 degrees Fahr. for 4-6 chromium - molybdenum steel. Fig. 4—Creep-stress curve at 1100 degrees Fahr. for 4-6 chromium-molybdenum steel

Affected by Corrosion

It may be mentioned here that the duration of the second and the entering of the third stage of creep not only depends upon the stress employed at a given temperature but is also materially affected by the corrosion and scale resistance of the material under test.

Most engineers base the design of high temperature construction upon the creep strength of the materials. The creep strength customarily is expressed as the stress which produces creep at rates of 1 per cent per 10,000 hours or 1 per cent per 100,000 hours. To determine the creep strength of steels, long-time loading tests with varying stresses must be made and the resulting elongations measured accurately. Optical extensometers capable of reading to about 3 millionths of an inch are employed in our testing equipment. Usually four different stresses are used for each material at each temperature. Typical time elongation curves thus obtained are shown in Fig. 3. By plotting the rates of creep on logarithmic co-ordinates against the stresses required to produce them, an approximate straight line relationship often results as shown in Fig. 4. Creep rates of 0.01 per cent in 1000 hours and 0.10 per cent in 1000 hours may now readily be taken from this logarithmic chart.

A creep rate of 0.10 per cent per 1000 hours frequently is considered equivalent to 1 per cent in 10,000 hours and 0.01 per cent in 1000

for High Temperatures

hours equivalent to 1 per cent in 100,000 hours. However, it should be kept in mind that few of the creep data obtained up to the present time have been conducted for times exceeding 1000 hours, or about six weeks. How the time of test may influence the observed creep rate is illustrated in Fig. 5. This graph reveals that a stress of 22,000 pounds which produced a creep rate of 0.10 per cent after 1000 hours of actual test, resulted in a creep rate of 1 per cent in 1000 hours after loading for 5000 hours. This load would ultimately lead to fracture in less than 10,000 hours.

This condition is further illustrated in Fig. 6. In this diagrammatic sketch, three steels, A, B and C have the same creep strength at a given temperature after 1000 hours of loading. Steel A, however, will actually rupture in about 11,000 hours, steel B in about 100,000 hours, while the rate of creep for steel C remains constant throughout.

New Test Initiated

In co-operation with the department of engineering research of the University of Michigan a new testing procedure has been initiated which should throw additional light upon the strength of materials at elevated temperatures. This test procedure consists of stressing specimens at various loads until actual rupture occurs. The loads which lead to rupture are then plotted on logarithmic co-ordinates against the time elapsed until fracture takes place. Typical stress versus "time for rupture" curves are illustrated in Fig. 7. It is interesting to note that the curves drawn in this manner are apparently straight lines, allowing the extrapolation of these laboratory results to time periods equivalent to the commercial life desired. These graphs give the characteristics of the regular 4-6 Cr-Mo steel as well as the Sicromo 5 anaylsis at temperatures of 1200 and 1300 degrees Fahr. Breaks appear in the lines of the 4-6 Cr-Mo steel while the curves for the Sicromo 5 material do not deviate from the single straight line. These breaks apparently are the result of oxidation progressing with prolonged heating times.

There appears to be a definite relation between rupture strength and the creep strength of a material for a given temperature as may be seen from Table No. 1.

Rupture tests do not require the sensitive extensometers necessary for conducting of creep tests. More economical equipment for determining the high temperature strength of steels may therefore offer an inducement to other laboratories to obtain information along this line. This would materially help in obtaining more reliable data as to the physical behavior of steels at elevated temperatures.

Twenty years ago, plain carbon steel was practically the only material available for still tubes. However, advances in refining practice called for higher and higher temperatures and increasing pressures. To meet these demands alloy steels had to be used and during recent years steel makers have kept pace with the oil industry in perfecting new steels which can be used economically in the modern refining processes. It is interesting to note the effect which various elements

Fig. 5—Influence of duration of test on reported creep stress for annealed DM steel at 1000 degrees Fahr. Fig. 6—Steels of same creep strength may have different life. Fig. 7—Typical stress-time diagram for rupture curves. Fig. 8—Effect of carbon upon creep strength of steel with 0.50 per cent manganese. Fig. 9—Influence of chromium on creep resistance of annealed electric furnace 0.50 per cent molybdenum steel

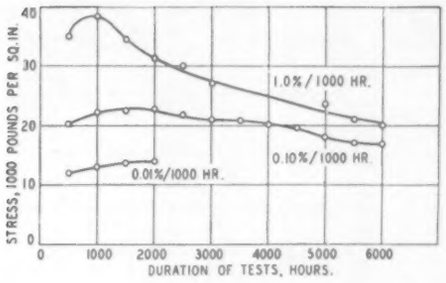


Fig. 5

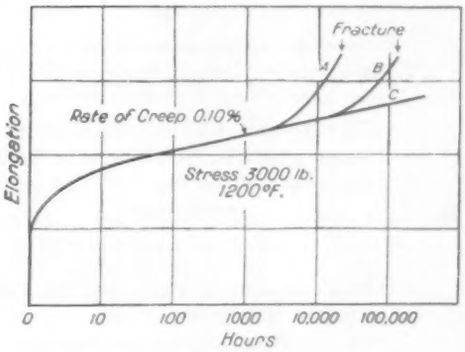


Fig. 6

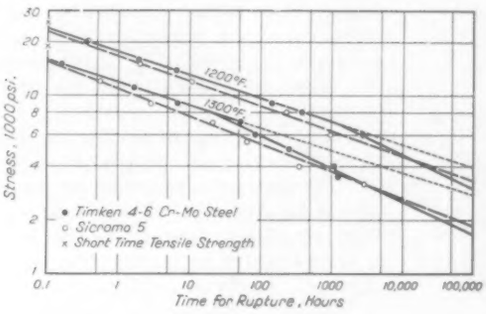


Fig. 7

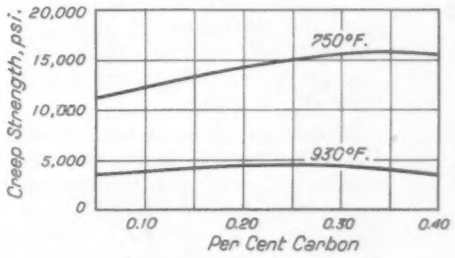


Fig. 8

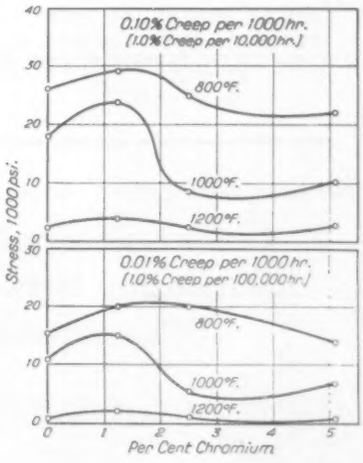

0.10% Creep per 1000 hr. (1.0% Creep per 10,000 hr.)
800°F.
1000°F.
1200°F.
0.01% Creep per 1000 hr. (1.0% Creep per 100,000 hr.)
Stress, 1000 psi.
Per Cent Chromium

Fig. 9

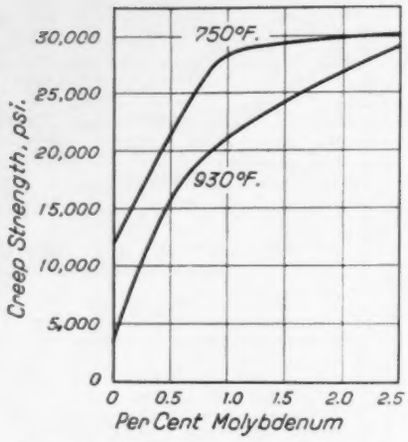


Fig. 10—Effect of molybdenum on creep strength of steel with 0.10 per cent carbon and 0.50 per cent manganese

have on the high temperature strength of steels.

A common way of increasing the room temperature strength of a steel is by raising the carbon content. The same procedure, however, does not apply to high temperature material. Fig. 8 illustrates the effect of carbon upon the creep strength of a steel containing 0.50 per cent of manganese. At the lower temperature an increase in carbon to 0.30 per cent resulted in an increase in strength. No effect, however, could be obtained at the higher temperature by raising the carbon content. Later investigations seem to indicate that not the carbon content, but the form of the carbides in the microstructure of the material, the presence of lamellar or spheroidized pearlite, is a controlling factor in influencing the creep strength of steels.

Chromium is an element added to the majority of high temperature steels not only for increasing the creep strength but for improving the oxidation and corrosion resistance as well. However, as shown in Fig. 9, the creep strength is not directly proportional to the chromium content at any of the three temperatures considered. In fact, the maximum occurs at about 1.25 per cent and decreases as the chromium content is either raised or lowered. This relationship, however, may be altered with varying molybdenum content or by the addition of other elements.

Molybdenum, tungsten and vanadium are primarily carbide forming elements and are in this respect similar to chromium. They increase the creep strength at elevated temperatures as may be seen in Fig. 10, which illustrates the effect of molybdenum upon the creep strength

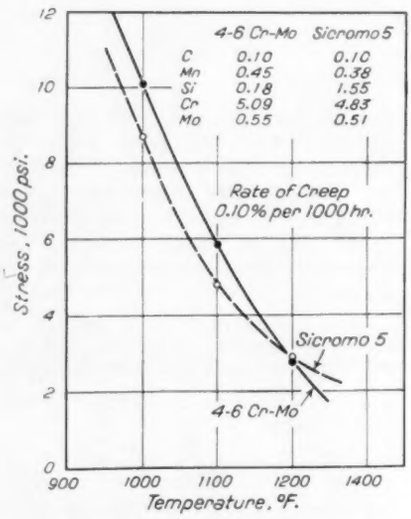


Fig. 11—Effect of 1.5 per cent silicon on creep strength of 4-6 chromium-molybdenum steel at varying temperatures

of carbon steel at 750 and 930 degrees Fahr. Silicon and aluminum differ from the elements previously considered in that they largely enter into solution in the ferrite. Their direct effect upon creep is negative as they lower the high temperature creep strength. Indirectly, however, their ability to materially increase the scale and corrosion resistance of the steels may result in higher strength values for long time loading especially at temperatures exceeding 1200 degrees Fahr. Fig. 11 proves this statement, indicating the effect of 1.5 per cent of silicon upon the creep strength of 4-6 Cr-Mo steel at varying temperatures.

There are other factors outside of chemical composition which may noticeably influence the creep strength of steels.

The melting process, the melting practice, and the casting practice seem to affect the strength of materials at elevated temperatures. Results available indicate that electric furnace steel is superior to the open hearth product, killed steels are superior to those of the open or rimmed type.

The heat treatment should be such that a high degree of structural stability is maintained at a given operating temperature. Annealing in general answers this requirement. Recent tests revealed that a heat treatment which produces coarse ferrite grains increases the creep strength while a complete spheroidization of the cementite lowers creep resistance.

Previous cold deformation appar-

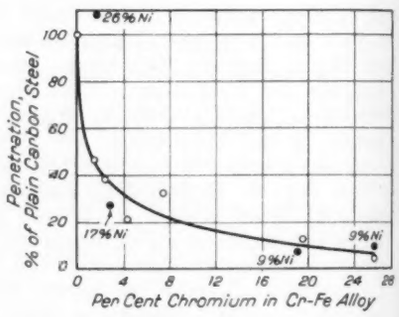


Fig. 12—Relation of corrosion rate and chromium content of steels in cracking furnace tubes

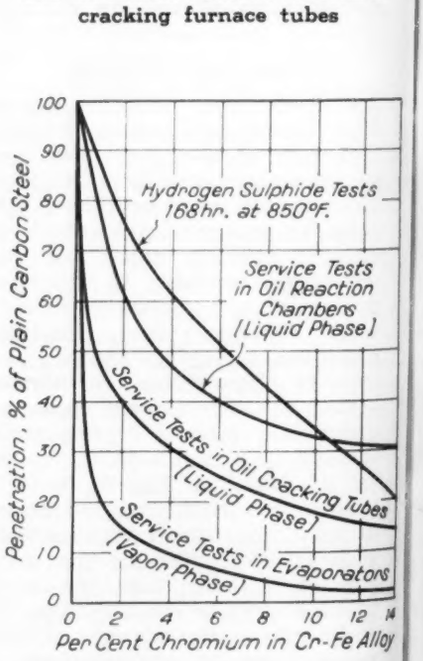


Fig. 13—Service and laboratory tests on the corrosion of a series of 15 iron-chromium steels

TABLE I

Relationship Between Creep and Stress-Rupture Characteristics for Sicromo 5 Steel

Temperature Degrees F.	Creep Strength 0.01%/1000 Hours	Rupture Strength Fracture in 100,000 Hours	Ratio of Creep Strength to Rupture Strength
1,000	5,450	10,000	0.545
1,100	2,600	5,400	0.481
1,200	1,600	3,150	0.508

ently decreases the creep resistance, probably due to the faster rate of spheroidization of the cold worked steel.

In general it may be stated that the ability of a steel to resist creep is a sensitive property, influenced by many factors.

Although it is possible to improve the strength of materials for high temperature service, the effects of corrosion and the resulting wastage during the service of an installation may be as important as creep properties in limiting the application of a steel. In fact corrosion resistance is often the first requirement that must be satisfied in the selection of a steel for high temperature use. Unfortunately laboratory tests are not dependable, because the nature of the corrosion either is not or cannot be reproduced. To study corrosion problems for a reasonably long period, the tests should be conducted on an experimental scale in an actual commercial installation. The oil refiners could be of material help in the development of economical alloy steels for high temperature service by their co-operation in such a testing program.

In general an increase in carbon content results in an increase in the corrosion rate. However, this fact sometimes has to be disregarded if a material of good hardenability is desired.

The effect of chromium on the resistance to oil corrosion at elevated temperatures is shown in

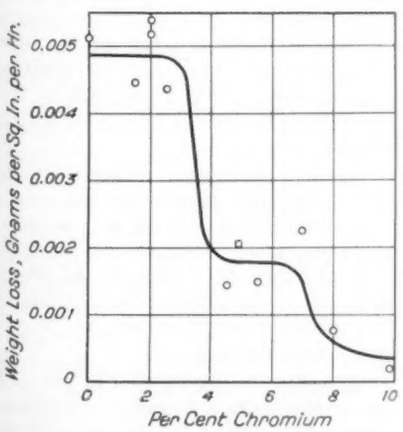


Fig. 14—Effect of chromium content on scale resistance in air at 1300 degrees Fahr., heating time 120 hours

Fig. 12. According to the data, quite small amounts of this element cause a pronounced decrease in the rate of corrosion. The corrosion rate curve approaches a straight line with chromium additions exceeding 3 per cent, indicating that above this amount of chromium protection against corrosion is proportional to the chromium content of the steel. This graph also shows that additional alloying with nickel has no effect upon the oil corrosion resistance of the material.

Confirming evidence on the corrosion resistance of the plain chromium steels in several classes of refinery service is given in Fig. 13.

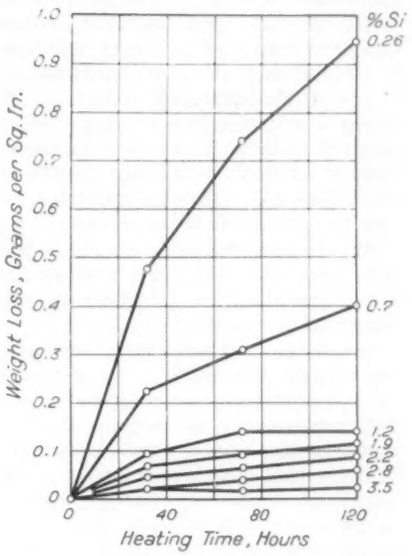


Fig. 15—Effect of silicon on scale resistance of a 5 per cent chromium steel at 1475 degrees Fahr. in air

These curves exhibit the same trend as the previous graph, the decrease in the rate of attack being again most marked for additions of chromium up to 2 or 3 per cent. For many applications this amount of chromium may provide sufficient corrosion resistance and would constitute a more economical choice than the regular 4-6 per cent chromium steel.

The element molybdenum, which is commonly present in steels for high temperature service, does not significantly affect the oil corrosion resistance of the plain chromium

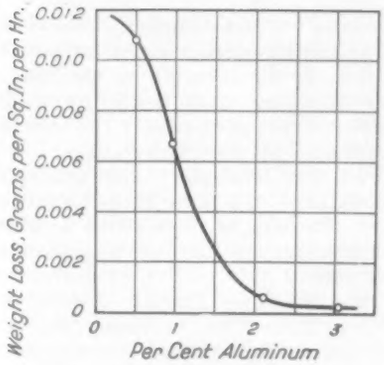


Fig. 16—Effect of aluminum content on scale resistance of a 5 per cent chromium-molybdenum steel in air at 1475 degrees Fahr., heating time 120 hours

steels. As an addition to the austenitic chrome-nickel steels of the 18-8 type, however, it may materially increase the resistance of these stainless steels, especially against sulphuric acid.

The addition of silicon or aluminum to the standard chromium steels results in a noticeable increase in their corrosion resistance. While the available data are still limited, service records indicate that a 5 per cent chrome-molybdenum material with silicon and aluminum additions gives twice the corrosion resistance of regular 4-6 per cent Cr-Mo steel in oil cracking tubes for refining certain sour crudes.

A moderate increase in the corrosion resistance of chromium steels is obtained by additions of titanium and columbium, since these elements form carbides thereby releasing a certain amount of chromium for the enrichment of the ferrite. Their effect in eliminating the air hardening of the chromium steels, however, is the main reason for adding these elements.

Variations in micro-structures do not materially affect the oil corrosion resistance of steel at elevated temperature, although fully annealed materials generally give best

TABLE II

Composition and Maximum Service Temperatures of Selected Steels for Oil Refinery Equipment

Steel	Carbon	Manganese	Silicon	Chromium	Molybdenum	Nickel	Maximum Service Temp.
Carbon (killed)	.08-.18	.30-.60	.25 Max.	.....	.....	.....	900° F.
C-Mo	.08-.18	.30-.60	.25 Max.	.....	.45-.65	.....	1,000° F.
Silmo	.15 Max.	.30 Max.	1.15-1.65	.....	.45-.65	.....	1,100° F.
DM	.15 Max.	.30-.60	.50-1.00	1.00-1.50	.45-.65	.....	1,100° F.
2 Cr-Mo	.15 Max.	.30-.60	.50 Max.	1.75-2.25	.45-.65	.....	1,200° F.
Sicromo 2½	.15 Max.	.50 Max.	.50-1.00	2.25-2.75	.45-.65	.....	1,200° F.
5 Cr-Mo	.15 Max.	.50 Max.	.50 Max.	4.00-6.00	.45-.65	.....	1,200° F.
Sicromo 5	.15 Max.	.50 Max.	1.00-2.00	4.00-6.00	.45-.65	.....	1,300° F.
18-8 (KA2-S)	.07 Max.	.50 Max.	.75 Max.	17.00-19.00	.....	8.00-10.00	1,300° F.

results. Cold working, however, and the internal stresses introduced by it, as for instance in the rolling in of tubes, may result in an increased corrosion rate in the affected portions of the material.

In the laboratory the oxidation resistance of a material is measured by the weight loss after heating specimens in air for a prolonged period of time. This procedure at best can only furnish relative information. The atmospheres encountered in industrial furnaces usually contain gases like CO_2 and water vapor, which may change the laboratory findings materially. Nevertheless the data furnished by the laboratory should be considered as valuable information expressing trends.

Oxidation Decreases

Fig. 14 shows the effect of chromium content upon the scale resistance of steel at 1300 degrees Fahr. in air. As may be seen from this graph, the oxidation decreases in steps with increasing chromium content. While chromium additions up to 3 per cent do not materially affect the scale resistance, a marked benefit could be obtained with chromium additions of 4 to 7 per cent. It requires, however, a chromium content of about 10 per cent to obtain commercially non-scaling properties at the given temperature.

The beneficial effect of silicon in reducing the attack of furnace gases at elevated temperatures led to the general use of this element as an alloy in heat resisting steels. Its effect is especially marked in combinations with chromium. Fig. 15 illustrates the effect of silicon upon a 5 per cent chromium steel. Even a silicon content of 0.70 per cent produces a marked improvement in the scale resistance and a steel with 5 per cent chromium and 1.5 per cent silicon may be considered as non-scaling at temperatures up to 1475 degrees Fahr. in air.

The effect of aluminum upon the scale resistance of steels is similar to the effect of silicon. Fig. 16 illustrates the increase in oxidation resistance obtainable with aluminum additions to 5 per cent chromium-molybdenum steel. Aluminum furthermore raises the transformation range of the steel and materially reduces air hardening, acting in this respect in a manner similar to titanium or columbium. Fig. 17 shows the effect of aluminum additions on the hardness of a 5 per cent chromium-molybdenum-silicon steel and also indicates to what extent the transformation temperature of the material is raised.

Steels for high temperature service should be tough. In fact, one of the first requirements to be met by materials for service in oil refineries is the absence of brittleness. Good initial ductility at room temperature does not always assure satisfactory toughness after prolonged service at operating temperatures. This condition is illustrated in Fig. 18, which shows the influence of time of heating under stress at 1000 degrees Fahr. on the ductility of SAE 1015 steel. The material which exhibits excellent values for elongation and reduction of area in the short time tensile test loses considerable ductility after prolonged heating. These values have been determined from rupture tests, previously discussed. The rupture test therefore also affords the best

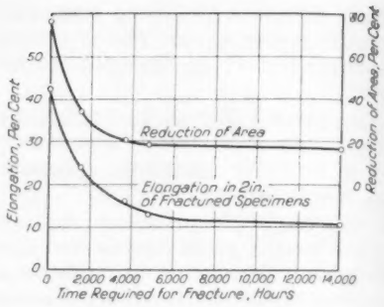

Elongation, Per Cent
Reduction of Area, Per Cent
Reduction of Area
Elongation in 2in. of Fractured Specimens
Time Required for Fracture, Hours

Fig. 18 — Structural instability. Influence of time required for rupture at 1000 degrees Fahr. on ductility of 1015 carbon steel

means available for determining the ductility properties of steels under the combined action of stress, time and heating. Fig. 19 shows a comparison in ductility values of the regular 4 to 6 per cent chromium-molybdenum steel and the same composition with 1.5 per cent silicon at 1200 degrees Fahr., indicating that due to the higher scale resistance of the silicon steel its high ductility is retained for prolonged times under stress at elevated temperatures, while intercrystalline oxidation materially reduced the toughness of the regular 5 per cent Cr-Mo analysis. In the same graph the change in ductility values for the stainless KA_2S steel at 1300 degrees Fahr. is illustrated. Here carbide precipitation and the resulting grain boundary attack lowers the toughness of the material to such an extent that failure under pressure without previous warning—that is, without bulging of the tube —may be expected and is actually experienced. This condition is frequently referred to as "tensile brittleness."

Plain chromium, chromium-silicon, and chromium-tungsten steels are susceptible to temper embrittlement after heating in service. The addition of molybdenum, about 0.50 per cent, effectively eliminates the temper brittleness of 5 per cent chromium steel.

Titanium and columbium are added to the 4 to 6 per cent chromium type steel primarily to prevent air hardening. It should be recognized, however, that these elements may promote grain-growth and lead to a structural condition possessing lower toughness.

Few steels are disqualified for high temperature service because of these shortcomings, although precautions have to be taken in handling some of the compositions to avoid circumstances conducive to brittleness.

A large number of high temperature steels are on the market today which have been built up from the plain low carbon steel by the addi-

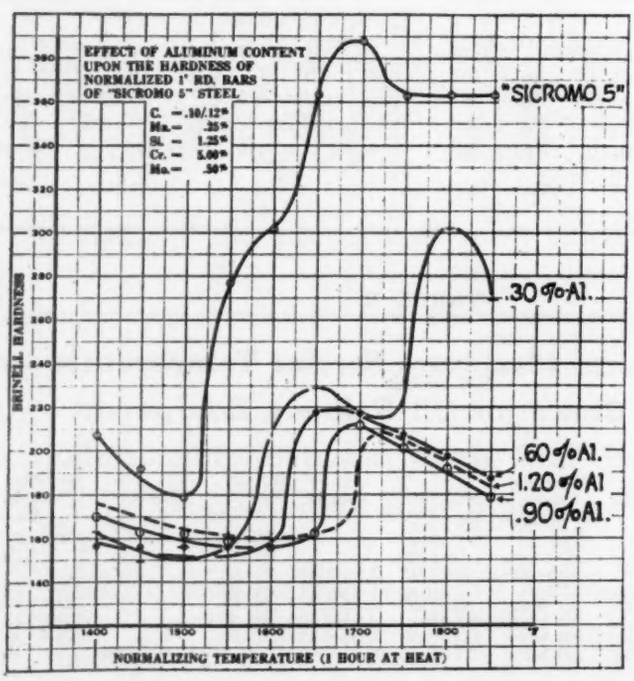


Fig. 17—Effect of aluminum additions on hardness of a 5 per cent chromium - molybdenum - silicon steel

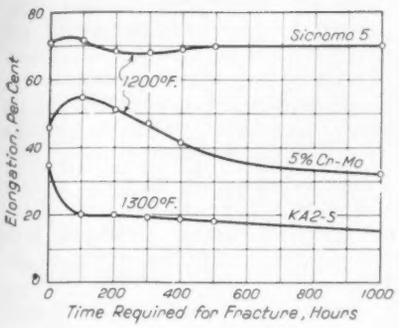


Fig. 19—Ductility characteristics of Sicromo 5 and 4-6 chromium-molybdenum steels at 1200 degrees Fahr. as well as KA2S steel at 1300 degrees Fahr. for fracture times up to 1000 hours

tion of the alloying elements previously discussed. Table No. 2 gives a selected number of steels, their composition and maximum service temperature for oil refining equipment.

Problems for Engineer

The scale resistance, creep strength and initial cost of these compositions are shown in Fig. 20. The designing engineer must balance oxidation and corrosion problems as they apply to the particular job at hand with creep strength and first cost. As previously discussed the oil corrosion resistance of a steel mainly depends on the chromium content of the material. This resistance may further be increased by silicon and aluminum additions.

Likewise the oxidation resistance of a steel is mainly controlled by these same three elements. It also should be realized that the extended load carrying ability of materials at elevated temperatures is materially influenced by the resistance of the steel against scaling.

While the addition of 0.50 per cent of molybdenum to plain carbon steel results in satisfactory creep strength up to 1100 degrees Fahr., the scale and corrosion resistance has not been altered. Silmo is a carbon-molybdenum steel with increased silicon content. Its oxidation resistance approaches that of the 5 per cent Cr-Mo steel. However, its oil corrosion resistance is not much better than that of carbon steel. Silmo may be used to replace carbon steel where greater safety is desired, or as a substitute for carbon-molybdenum where oxidation is a problem. Its creep strength is about twice that of carbon steel at 900-1100 degrees Fahr.

Chromium additions of 1.00-1.25 per cent produce a maximum effect upon creep strength in the temperature range 800-1100 degrees Fahr. This chromium content is used in the DM steel. It excels in creep strength all other intermediate alloy steels up to 1100 degrees Fahr. Its oxidation and corrosion resistance is approximately two to three times that of plain carbon steel.

Additional oxidation and corrosion resistance is offered by a series of Sicromo steels, of which the Sicromo 2½ is given as an example. The Sicromo 1, 2 and 3 steels, the numbers designating the chromium content, also are intermediate molybdenum steels between DM and the 4-6 per cent chromium alloys. In some liquid and vapor phase applications the rate of corrosion of these steels is nearly as low as in the 4-6 per cent Cr-Mo steel and their oxidation resistance is distinctly better.

The 4-6 Cr-Mo steel has been used extensively in the oil industry. Service data indicate that tubes made from this steel will last approximately five times as long as plain carbon tubes in cracking still service.

Considerable improvement over this performance of the 4-6 per cent Cr-Mo steel may be obtained by adding 1-2 per cent silicon to this steel as an additional alloy as is the case in the Sicromo 5 composition. This material has an oxidation resistance in air similar to 18-8 steel up to 1500 degrees Fahr. Its corrosion resistance and creep strength compare favorably with 4-6 per cent Cr-Mo steel.

Where maximum creep strength plus corrosion and scale resistance at elevated temperatures is demanded, the austenitic stainless steels still offer the best combination of these properties. However, their high thermal coefficient of expansion frequently complicates design and their high initial cost may prove uneconomical as the relatively rapid advance in refining technology may make an installation obsolete before the economic value of equipment has been obtained. Their objectionable tensile brittleness has been overcome by stabilizing the alloy with titanium or columbium and their creep strength and corrosion resistance has been further increased by the addition of 2 to 4 per cent molybdenum. This latter composition, developed in our laboratory, may now be obtained in the form of seamless tubes and is marketed as "16-13-3," a composition of 16 per cent chromium, 13 per cent nickel and 3 per cent of molybdenum.

Selecting steels for high temperature service requires an understanding of the factors influencing corrosion resistance, oxidation resistance, and strength of materials. Maximum efficiency and economy may frequently be secured by selecting different steels for different locations in the same furnace. No one steel is most suitable for all applications.

Best performance with economy may be obtained by co-operation. The steel producer, the designer and the operator should all work hand in hand in solving the technical problems of present day high temperature construction.

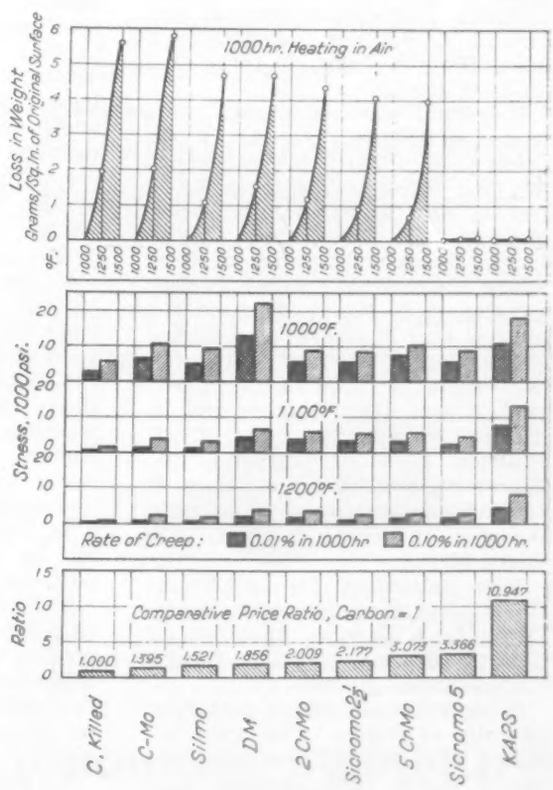


Fig. 20—Scale resistance, creep strength and initial cost of a selected number of steels for oil refining equipment

Automotive Engineers Hold Annual Meeting And Exhibit in Detroit

■ WITH registered attendance well over 1000, the annual meeting of the Society of Automotive Engineers convened in Detroit last week, with technical sessions held throughout five days concurrently with an exhibition of automotive parts and equipment in the Book-Cadillac hotel.

General subjects covered by more than 30 papers at the technical sessions, all well attended, included transportation and maintenance, aerodynamics, aircraft instrument landing, aircraft engines, passenger car safety, air conditioning, car noise, production activity, diesel engines, fuels and lubricants.

Elected President

C. W. Spicer, vice president, Spicer Mfg. Corp., Toledo, O., was formally elected president to succeed H. T. Woolson, executive engineer, Chrysler Corp., Detroit, at a business session.

Divisional vice presidents were named as follows: Aircraft, F. W. Colwell, Hamilton Standard Propeller Co.; Aircraft Engines, R. N. Dubois, Aviation Mfg. Corp.; Diesel Engine, Carl Behn, Otto Engine Works; Fuels and Lubricants, B. E. Sibley, Continental Oil Co.; Passenger Car, C. R. Patton, Packard Motor Car Co.; Passenger Car Bodies, Frank Spring, Hudson Motor Car Co.; Production, E. N. Sawyer, Cleveland Tractor Co.; Tractors and Industrial Power Equipment, C. E. Frudden, Allis-Chalmers Mfg. Co.; Transportation and Maintenance, F. L. Faulkner, Armour & Co.; Truck, Bus and Railcar, H. E. Simi, Twin Coach Mfg. Co.

New counsellors for 1938-39 are W. J. Davidson, General Motors Corp.; L. J. Grunder, Richfield Oil Co. of California; and B. J. Lemon, United States Rubber Co.

Some 36 manufacturers participated in the exhibition. They included: Spicer Mfg. Corp.; American Hammered Piston Ring division, Koppers Co.; Perfect Circle Co., Doehler Die Casting Co., Campbell, Wyant & Cannon Co.; Timken Roller Bearing Co.; Neoprene division, E. I. du-Pont de Nemours & Co. Inc.; Thiokol Rubber Products Co.; Wyman-Gordon Co., International Nickel Co. Inc.; Gemmer Mfg. Co.; Garlock Mfg. Co.; Ohio Crankshaft Co.; Acheson Colloids Co.; Baldwin-Southwark Mfg. Co.; Air Reduction Co.; Wilson Welder & Metals Co.; Cleveland Graphite Bronze Co.; Aluminum Co. of America; Zollner Machine Co.; and S. S. White Dental Mfg. Co.

Of more than passing interest to the metals industries was a paper by Ralph H. Upson, consulting engineer, on the use of self-tapping screws in mechanical and structural assemblies. Pointing out that the development of case hardening made possible the success of the modern self-tapping screw (for metal), Mr. Upson listed a number of advantages which such fasteners possess. They include:

1. Compared to other types of screws, they save the separate operation of tapping female threads, or the use of threaded nuts.
2. The fact that each screw taps its own mating threads insures a close fit, which avoids play in the joint and discourages loosening.
3. Compared to conventional rivets and welding, screws permit working from one side alone, an important item for tubes, blind sections, and all closed or confined assemblies.
4. They readily permit disassembly for inspection, repair or other purpose.
5. The screw is prefabricated in its finished form by a well controlled process, which permits generally higher strength material than rivets, and establishes known conditions for a straightforward stress analysis.
6. Inspection is simplified by confining its importance to one side; and by the fact that failure of the material around the screw causes loosening and usually unscrewing, which is readily observable in its initial stages before more serious consequences develop.

Discussing such factors as requirements for self-tapping, insertion torque, screw strength, hole size, tightening and loosening torque, joint shear strength, and holding strength, Mr. Upson concluded that the ease with which metal parts can be joined, the firmness with which they are held together and the facility with which they may be separated are advantages which self-tapping screws offer in higher degree. He also noted that such screws are a logical resort where welding might be unsuitable by reason of difficult access, improper material or lack of permanence. For airplane-type structures, now increasingly applied to buses and other vehicles, time studies have shown that on an average screws can be inserted for less than half the cost of rivets.

Machinery Paper Featured

Important part which machinery has played in the development of modern automotive manufacturing methods was alluded to by Joseph Geschelin, *Automotive Industries*, in a paper featured at the production session. He reviewed in a general way some of the changes which have come about in the planning and correlating of automobile assemblies as far as plant and equipment are concerned. Flexibility and universality were suggested as keynotes of the production philosophy evolved in recent years.

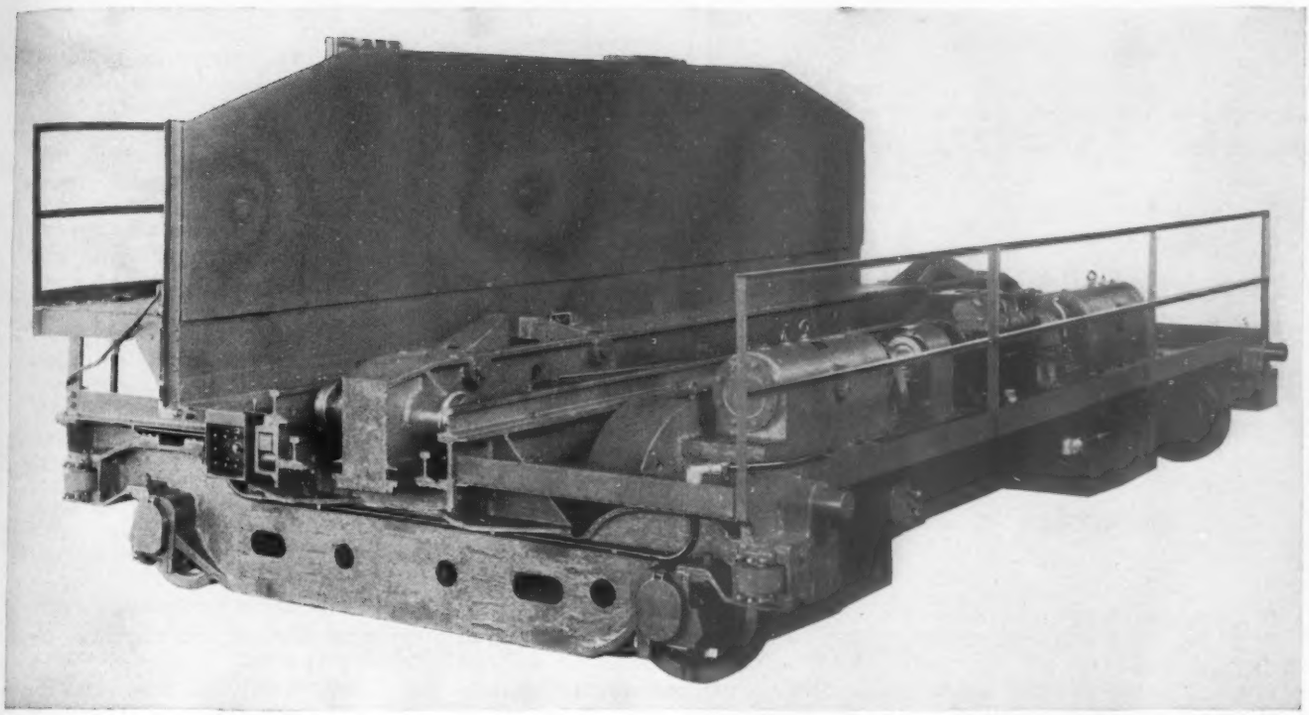
Examples of current production practice were cited, such as Cadillac's development of a line of V-8 engine blocks interchangeable through the entire line of LaSalle and Cadillac models; and Packard's segregation of production into two channels—the senior line and the junior line—with each group given its own production facilities.

Machine tools now used in the automobile industry fall into three general classifications—special or single-purpose machines, unit-type machines, and standard or universal type machines. The second type has been gaining steadily due to flexibility.

Mr. Geschelin briefly high-spotted developments in welding, cutting tools, grinding, presses, and synthetic finishes.

"In the near future some form of safe economical automotive refrigerating system will appear, and when it does, we can go merrily on our way, laughing at the weather-

(*Please turn to Page* 63)



Transfer car, built by Morgan Engineering Company, Alliance, Ohio; equipped with double acting pusher for annealing boxes. The pusher bar casting, 25 feet, 4½ inches long, is Manganese-Vanadium Steel, made by The Machined Steel Casting Co., Alliance, Ohio.

THE PUSHER BAR CASTING
Is Manganese-Vanadium Steel

Built for hard work . . . and equipped to stand it . . . is Morgan Engineering's new transfer car, with its pusher bar casting of Manganese-Vanadium Steel.

This Manganese-Vanadium casting is 25 feet, 4½ inches long, weighed 12,820 pounds in the rough. Its physical properties, typical of those of many other Manganese-Vanadium castings, are as follows:

Elastic Limit	73,450 lbs. per sq. in.
Tensile Strength	111,200 " " " "
Elongation	22.5%
Reduction of Area	45.4%

If the service and reputation of your product depend upon the strength and dependability of a casting, or if castings play a part in your production equipment, investigate the advantages of Manganese-Vanadium Cast Steel. Metallurgical engineers of the Vanadium Corporation of America will be glad to co-operate with you.

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Plants at Bridgeville, Pa., and Niagara Falls, N. Y.
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FOR STRENGTH · TOUGHNESS · DURABILITY

METALS VANCORAM ALLOYS

FERRO ALLOYS
of vanadium, silicon, chromium, and titanium, produced by the Vanadium Corporation of America, are used by steel makers in the production of high-quality steels.

Progress in Refractories

Review of field in 1937 shows manufacturers and consumers working together to develop materials suitable for more exacting service. Trend continues toward wider use of insulating refractories and improved insulation. Need is for higher temperature refractories to reduce steelmaking costs

■ STEEL quality and economy in production depend in a large measure upon the life and performance of refractories used in metallurgical furnaces. Refractories manufacturers and steelmakers recognize this situation fully and during the past year the two groups worked together closely in the development of adequate materials. Efforts in 1937 were directed largely toward improving existing refractories and applying them judiciously so that better results might be obtained. The trend continues strongly toward use of insulating refractories and more advanced methods of insulation. Quality of refractory materials has been improved by refinements in manufacturing technique.

One of the factors stimulating study of refractory applications has been the establishment by many steel companies of a trained personnel to test and select refractories and to interpret service conditions, according to Gilbert Soler, manager of research, Steel & Tube division, Timken Roller Bearing Co., Canton, O. He says, "A more careful matching of existing refractories to service conditions has not only resulted in lower refractory costs but has improved steel quality. To accomplish this, proper interpretation of service results and test data is necessary. Thus refractory producers are getting closer to consumer's problems."

Applications Are Studied

"Increased attention," he continues, "has been paid to furnace design and insulation as affecting refractory life. Design, shape, size and support of refractory blocks were studied. Special super-refractories have been used in critical service locations. Plastic and castable refractories were substituted for bricks or shapes, resulting in lower cost.

"Progress in manufacturing technique includes use of de-airing equipment both on stiff mud and dry press brick machines. Such equipment is now undergoing extended application because high density brick is desirable for such service as in linings of blast furnaces and regenerator checkers. Other advances in technique include grain size proportioning, use of higher forming pressures with improved firing practice and bonding materials. These result in a more homogeneous product with improved physical properties.

"New refractories announced during the year included 'Thomasite,' a new bottom material, and a synthetic basic material of composition similar to the mineral merwinite.

Developments Through Research

"Future refractory developments," points out Mr. Soler, "are not restricted by raw materials, as synthetic refractories can be produced by combination of several oxides or compounds which, although not suitable as refractories themselves,

Backing up refractories in soaking pits with insulating material has followed practice pioneered with open-hearth furnaces. Among the many advantages to be derived are increased life of the refractories, better fuel economy and more uniform heating

may in combination result in a refractory compound with excellent physical properties. Much can be done in substituting autogenous or solid solution bonds for conventional glassy bonds which weaken most refractory brick at temperatures much below the fusion point of the grog material. Intercrystalline growth and sintering can be promoted at high temperatures with the aid of mineralizers and increased surface contact."

As to future developments, Mr. Soler calls attention to the need for a more refractory roof brick for open hearth and electric furnaces. "If higher temperatures could be employed during the melting period, considerable saving in steel production costs would result. Other needs include improved pouring pit refractories for ladle bricks, nozzles, etc., to eliminate the hazard of entrained refractory inclusions in steel. Refractory materials impervious to gas flow are needed for furnaces employing controlled atmospheres."

Development of a more refractory roof brick for open-hearth and electric furnaces would permit higher temperatures during the melting period and thereby would effect substantial savings in steelmaking costs. Considerable progress is being made in this direction

Improvements Are Reviewed

Commenting on strides taken by the refractory industry in 1937, Fred A. Harvey, director of research, Harbison-Walker Refractories Co., Pittsburgh, states: "Probably the most distinctive trend of the year has been the great increase in the use of super duty fireclay brick due to its excellent resistance to spalling and constancy of volume at high temperatures. It has received wide application in checkers of blast furnace stoves and open hearth regenerators, in heating furnaces of various types and in malleable furnace bungs, sidewalls and bottoms.

"Metal encased magnesite brick of an improved form found wide application in exposed walls of open hearth furnaces and in electric furnace sidewalls.

"Forsterite brick, made from an olivine bearing rock to which magnesite is added during manufacture, was improved during the past year by a modification of the grind to secure denser packing and by firing to an exceptionally high temperature.

"Unburned chrome brick, chemically bonded, is taking an increasingly important position as a refractory for the open hearth.

"Power pressed brick in blast furnace linings established two new record runs and it is believed these will be exceeded by several furnaces which are still operating although production now exceeds 1,500,000 tons. Power pressed or extruded brick from which the air is evacuated during molding find increasing application.

"One of the high points of this year," continues Mr. Harvey, "is the wider use of insulation on many types of furnaces. In general, insulating refractories are finding increased favor for furnaces operated intermittently. Composite wall construction consisting of dense refractory brick with a backing of insulating brick are favored for furnaces operating continuously. A definite improvement in quality of insulating brick has been noticed," he adds.

"Production of cyanite concentrate in North Carolina has received considerable impetus due to the increased use of this mineral in refractory cements and coating materials and because an unusually high grade insulating refractory can be made from it," notes C. E. Bales, vice president, Ironton Fire Brick Co., Ironton, O. He adds, "Trends of the industry include extension of laboratory control over manufacturing process and development of new uses for refractory specialties. Special grades of plastic refractories have been developed which perform much better than fire brick in foundry ladles where 'Purite' is used. Machine-made cupola blocks are rapidly replacing hand made blocks in gray iron foundries.

"Non-spalling fire clay paving brick is now being used by many malleable foundries in floors of annealing ovens instead of the usual red paver. It gives a smoother floor and does not crack or break up."

Slag attack still remains one of the most destructive forces encountered by refractories, according to L. C. Hewitt, director of research, Laclede-Christy Clay Products Co., St. Louis. He calls attention to a new high alumina product which shows excellent resistance to slags running high in iron oxide and lime. He says, "The new alumina product has a resistance to slag attack at very high temperatures many times greater than first quality or even super heat duty refractory types. A new super plastic also of the high alumina type supplements the high alumina brick and has worked out successfully in patching eroded areas.

Provides Safety Margin

"Another development is a highly dense tap-out block for malleable furnaces. This added density, combined with high refractoriness and resistance to cracking, affords a margin of safety in those malleable furnaces operating at high capacities," Mr. Hewitt points out.

Another trend in refractory application involves the use of Carbofrax, a bonded silicon carbide in the form of heat exchanger tubes suitable for various recuperator designs. Commenting on this trend, W. H. Fitch, manager recuperator department, Carborundum Co., Perth Amboy, N. J. says, "The scientifically designed recuperator has great possibilities. This statement is based on results recently obtained

with Carbofrax tubular recuperator applications to various types of heating and melting furnaces. Unquestionably the principle of recuperation is simpler than regeneration. This in itself has stimulated study of recuperator design and materials. Recent progress includes acceptance of recuperator type soaking pit furnaces in which the recuperator heats blast furnace gas as well as air.

"Metallurgical considerations," Mr. Fitch points out, "have been responsible for the acceptance of recuperative furnaces for reheating ingots in the steel industry.

"Tubular recuperators have been applied recently to a number of melting furnaces tapping 5 to 35 tons per heat. The exceptional life of Carbofrax tubes and work done in service indicate large capacity open-hearth furnaces of the recuperative type are worth consideration. Recuperator design and application has been facilitated by silicon carbide tubes as heat transfer elements because they eliminate joints in the waste gas area, are accessible for inspection, cleaning and replacement and make possible scientific sealing of the entire structure.

"Recuperators," concludes Mr. Fitch, "are growing in favor among combustion engineers and furnace operators as long life of the recuperator structure in addition to efficient operation is being made possible."

More Insulating Refractories

Reviewing 1937, S. M. Jenkins, high temperature insulation division, Armstrong Cork Products Co., New York, emphasizes the improvements in insulating refractories and developments in their application. He recalls that insulating brick were first used directly exposed in electric furnaces only, later in gas-fired furnaces and now are used directly exposed in oil-fired furnaces, powdered-fuel-fired furnaces and practically any combustion condition. When care is taken not to subject them to temperatures higher than those for which they were intended, they can be used in furnaces with neutral, reducing or oxidizing atmospheres and will show good life as some installations have been in furnaces over 5 years.

Regarding furnace structures, Mr. Jenkins says, "Insulating fire brick have made possible the use of thinner and lighter hanging walls and flat arches. This permits greater use of steel structures for holding the settings together and for steel encased equipment. For the walls it has been found that a good refractory cement seals the joints and knits the porous brick into a monolithic mass — the cement being one that expands and contracts with the insulating fire brick. Ramming mixes also have been used successfully as a facing. Developments along the line of heavier facings for insulating refractories have offered some encouragement for facings of various thicknesses. Facings can be so constructed as to hold the desired amount of heat in the furnace and no more, and offer a usual amount of flexibility.

"Insulating brick have proved their adaptability for certain sections of incinerators where slagging has been eliminated by using directly exposed insulated refractory brick in the combustion chamber, flues and waste heat boiler sections. This is due solely to the fact that the insulating refractory brick have such a low heat storage and consequently such a low wall temperature that fly ash will not flux to it."

Mr. Jenkins points out that the use of insulating fire brick is becoming more important in all heated equipment and that every piece of such equipment should be studied carefully with the thought of using insulating refractories in certain sections, if not throughout. As failure in insulating refractory is much more serious than in insulating brick behind fire brick walls, the following factors should receive consideration, he says.

Uniformity is of greater importance because of the thinner wall constructions used. Shrinkage of the insulating fire brick should be low, the structure free from checks, cracks, voids, stratifications or soft centers and of equal strength when laid flat or on edge.

Effects of expansion should be minimized as much as possible. Resistance to spalling is necessary, especially in intermittently fired furnaces. The principal demand made on these brick is to allow a furnace to be brought up to temperature quickly. Physical strength should be ample at high temperatures, particularly in arches, pilasters and projecting flues.

Points To Be Considered

Insulating efficiency is not the principal item in an insulating fire brick but should be the highest possible. The overall ratio between walls of insulating fire brick and fire brick should be about 6 to 1 in the matter of heat storage and insulating efficiency. Fusion point should be high enough that a sudden peak of furnace temperature will not soften the insulating fire brick. Modulus of rupture is of importance in some furnace constructions and should be close to 100 pounds per square inch.

As a guide in drawing up specifications covering all these points, Mr. Jenkins suggests the following outline: chemical analysis, structure, hot surface temperature, modulus of rupture, cold crushing strength (per A. S. T. M. 93-34T), hot crushing strength (at various temperatures), fusion point, weight, conductivity, spalling loss and shrinkage.

Two New Developments In Galvanizing

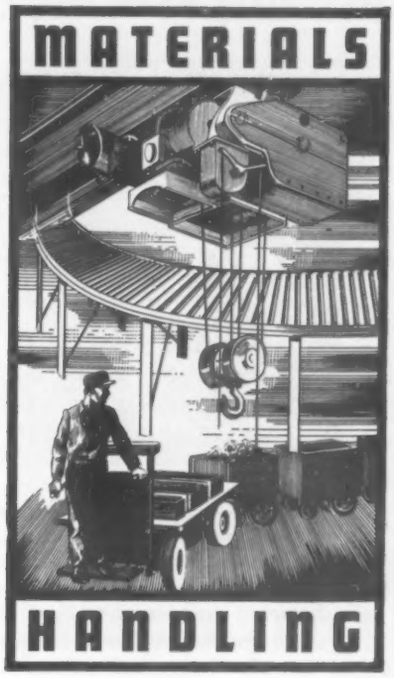
■ Two new major developments in galvanizing recently announced (STEEL, Jan. 3, page 394) by W. H. Spowers Jr., consulting galvanizing engineer, 551 Fifth avenue, New York, have been tried out thoroughly in his laboratories and have proved entirely satisfactory in commercial practice, it is claimed.

One of them eliminates the necessity of replacing galvanizing kettles more or less frequently. Kettles now are fusion lined with a material impervious to zinc, thus preventing attacks on the steel by the molten zinc. Also eliminated is that portion of the dross which results when iron from the steel plate kettle is dissolved into the zinc. The new lined kettles are manufactured by the Pfaudler Co., Rochester, N. Y.

The other development is a new blanketing material. This is a special, granular, activated carbon impregnated with an inorganic material. When placed on the surface of the zinc in the galvanizing kettle it forms a blanket of inert gas, preventing contact between the molten zinc and the air. As a result, no oxide can form. The seal formed by this material also effectively blankets the molten metal against heat loss through radiation. In some cases, reports Mr. Spowers, the use of the blanketing material has resulted in fuel savings of 35 to 50 per cent. The blanketing material is manufactured by the Gray Chemical Co., Roulette, Pa.

Aircraft to Copy Trains

■ Aircraft engineers will turn to new principles and designs developed by builders of lightweight, stainless steel trains, according to Col. E. J. W. Ragsdale, chief railway engineer, Edward G. Budd Mfg. Co., Philadelphia. Speaking before the national aircraft production meeting of Society of Automotive Engineers in Los Angeles recently, Col. Ragsdale expressed the opinion that the trend in aircraft construction may continue from the lighter alloys to stainless steel, aviation having available the ready-made technique already developed by builders of stainless steel trains. He stated the production trend is strongly in favor of welded fabrication using 18-8 stainless steel.



Fits Equipment to Job

Stainless steel manufacturer modernizes its handling facilities with tractors and specially-designed trailers which function in conjunction with cranes, hoists and other labor-aiding machinery– System is flexible

■ Trackless transportation is the basis of a new materials handling system recently installed in the plant of the Rustless Iron and Steel Corp., Baltimore. Essentially, the system is a combination of tractors and trailers, the latter in a variety of distinct types, each designed specially for the specific work which it must perform. Replacing a narrow-gage industrial railroad, the new equipment is providing the utmost in flexibility, with adequate capacity for rush periods of production, and with adaptability for special handling tasks.

The new transportation system is the most recent addition in the company's program of modernization of its materials handling facilities. Only a short time before the installation of the tractor-trailer units, construction work had been completed on a large new craneway covering storage areas in the plant yard, Fig. 1, this craneway adding appreciably to the efficiency of receipt and distribution of raw materials. The special trailers work in conjunction with two heavy-duty electric overhead traveling cranes which operate on the new runway. They are used to good advantage also in conjunction with numerous electric traveling cranes in various departments throughout the plant.

Previously, there was employed a mile or more of industrial trackage, which included a main line traversing the various departments, and accompanying sidings, crossovers, switches and turntables—a narrow-gage railroad inflexible to a degree which involved numerous handlings of materials and which required laying of additional trackage to reach new areas. When the company doubled its production capacity with formal opening of a $1,500,000 addition to its plant (STEEL, Oct. 4, 1937, p. 27), it provided for a 20,000-ton expansion of its annual ingot capacity.

Since the company performs all operations in conversion of virgin chrome ore and other materials into stainless bars, rods and wire ready for fabrication, and since a year's supply of chrome ore is maintained to assure adequate supplies at all times, the materials handling problems increased correspondingly with expansion of plant facilities. The question arose as to whether the industrial railroad trackage should be extended to and through

Fig. 1—Raw materials storage area with 650-foot craneway can be seen in this airplane view of the stainless steel plant. Note the network of concrete pavements connecting buildings and yard areas

Fig. 2 (left)—Special trailer for carrying slag pot between melting shop and slag dump. Four trunnions on the pot facilitate transfer between crane and trailer. Fig. 3 (right)—The tractor is pulling three trailers carrying scrap charging boxes. These boxes are handled by an automatic charger

the new plant buildings, or the entire system should be scrapped and replaced with an entirely new one. The latter appeared to the management a more desirable plan and, up to the present time, results have shown the wisdom of the choice.

Three distinct types of special trailers are employed. The first, Fig. 2, is designed and used for carrying slag pots. It is constructed with a skeleton framework carrying an A-frame at each end to support the pot on its trunnions. As will be noted, the slag pot has four trunnions so that it can be deposited on the trailer by overhead crane and lifted off by another crane for dumping on slag piles in the yard areas.

The second type of trailer is for handling loaded charging boxes to the melting shop. These trailers, shown in Fig. 3, have beds of proper height so that a Brosius automatic charger can pick up the loaded boxes, turn around, place the boxes in the furnace and overturn them to dump the charges. The third type includes a number of 6-ton trailers, one of which is shown in Fig. 4, and a number of 12-ton units for handling hot ingots, hot billets, or cold materials enroute to storage. A 12-ton trailer can handle a complete heat from a furnace.

Trailers are pulled around to various stations by two gas-powered industrial tractors, one with capacity for handling 25 tons, the other 35 tons. Interchangeable with these is a 3-ton electric industrial truck, Fig. 5, which had been installed some time ago for handling skid loads of wire and for other such work.

Operation Is Flexible

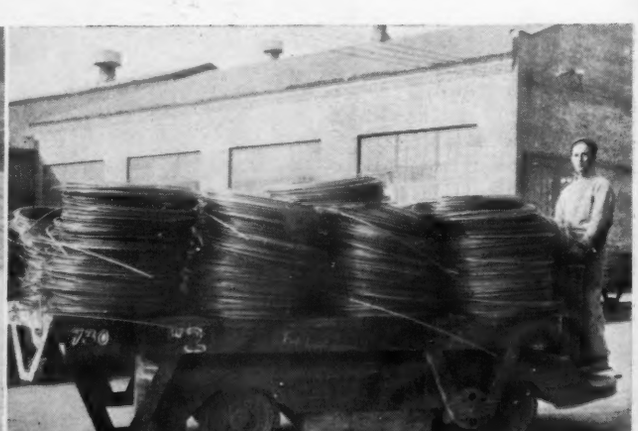
While tractor-trailer systems in many plants are operated on carefully timed delivery schedules, the very nature of the work in this instance precludes the use of any such scheduling. As explained by S. F. Ashley, superintendent of transportation, the plant is set up to supply any grade of stainless steel in any commercial size and any finish. In the melting shop it is necessary to handle large ingots. In addition to ingots of over 10,000 pounds for immediate sale, 10-inch ingots of approximately 1000 pounds apiece are produced regularly for rerolling within the plant. These 10-inch ingots are cogged to 6-inch squares and recogged to 4-inch square billets. A supply of billets ranging from 6 inches square down to 1½ inches square is carried in storage to await rolling into various forms.

In the melting shop are three 10-ton Heroult electric furnaces. All three may be in operation, or one may be down for relining. Specifications on orders may require different timing of heats. Specifications and tonnage in the rerolling mill also change from day to day depending upon the orders going through. With these varying conditions, it has been found that operating trailers on a signal system works to better advantage than placing each unit on a schedule.

Illustrating the flexibility of the trailer system is its recent use for transporting to point of use in the plant a large cold-draw bench received by rail at the company's switch tracks. Three trailers were lined up beneath the large machine,

(*Please turn to Page* 63)

Fig. 4 (left)—Close-up of one of the 6-ton trailers for transporting ingots and billets about the plant. Note that the truck is marked with its tare weight, number and capacity. Fig. 5 (right)—Electric truck and heavy-duty skids are used for handling wire in coils. When required, the truck supplies tractor service



Describes Developments in Process for Rolling Direct from Molten Metal

■ THE PROBLEM of rolling steel direct from molten metal, on a commercial basis, has not yet been solved, according to C. W. Hazelett, chairman of the board, Hazelett Metals Inc., 51 East 42nd street, New York.

However, along lines of work done on his process the past year, Mr. Hazelett believes the solution is in view. If the process were fully perfected within a year, the continuous hot strip mill would suffer not a dollar's depreciation, as anything so revolutionary would require several years for general transformation of equipment, he stated, adding that many continuous hot strip mills could be converted to cold finishing, with relatively little loss in value.

Mr. Hazelett expressed these views at a meeting of the New York chapter of the American Society for Metals at the Building Trades club, before a gathering of more than 200 engineers and metallurgists. With the aid of motion pictures, he described the development of his process as it has been applied not only to steel but to various nonferrous metals, particularly brass, copper and aluminum, In fact, the greatest strides to date have been in connection with the processing of nonferrous metals.

Copper Rolling Developed

He stated that the most interesting development in copper was in connection with the oxygen free copper process of the American Metal Co., New York, and Scovill Mfg. Co., Waterbury, Conn. Rolled on a Hazelett mill, the copper, he said, has reached a high degree of refinement under this process. He said they are shortly going to pour brass on the same mill.

The mill employed in this work is one leased by the Hazelett company to Atha plant of the Crucible Steel Co. of America. The oxygen free copper is rolled down on this mill to 0.0034 without annealing after leaving the mill. The results obtained on copper, he observed, have demonstrated the complete feasibility of the Hazelett process for the production of copper sheets.

With respect to steel, Mr. Hazelett stated he was developing a new mill, which he hopes will soon be put into practical operation in a steel plant. He said his major attack on the processing of steel is through the casting method and that the equipment now being perfected is a 36 x 36-inch mill with molten metal end dams.

Employs Two Procedures

By the casting method, he explained, he meant the application of only sufficient pressure to form the sheets with the sheets then going on to the regular rolls. Mr. Hazelett employs two procedures at present, the cast method and the combination cast and roll method. This latter is used in the processing of nonferrous metals.

Being revolutionary in many respects, the Hazelett process has not as yet attracted widespread interest of steel producers, he said. He accounted for this partly because of the heavy tonnage methods generally applied in the industry and partly because of the large investment that the steel industry has in its present type of equipment. It was at this point that he reassured the steel industry that even if this process were soon to meet all of the objectives now in mind it would certainly have no early depreciating effect on existing equipment.

When questioned about the life of roll surfaces in connection with his process for the production of steel, Mr. Hazelett said it was this problem that drove him to consider the casting mill in the processing of steel, rather than the combination casting and rolling method. He added that he has now worked out three different methods for the processing of steel, although he did not go into detail.

He described "the first and only" time he endeavored to roll stainless strip. This was in 1934 at the Huntington, W. Va., plant of the International Nickel Co. While the results were gratifying in many respects, they were not sufficiently good to cause him to undertake further effort along this line until certain other problems relating to the more ordinary grades of steel had been more fully solved. He said, however, that the finish acquired was comparable to that generally obtained on stainless steel eight or nine years ago.

After he had enumerated various problems, one of his listeners inquired, to the general merriment of the gathering, if he had ever tried the duplexing of alloy and ordinary steels. He replied that he had not, but said he did not think it impossible. He thought the problem was chiefly one of proper bonding. He said further, as a matter of fact, Russians have been experimenting with the bonding of copper on steel and that he himself had given some attention to the duplexing of certain nonferrous metals. Mr. Hazelett added, however, that "too many good things could sink a ship" and that he preferred to keep his activities for the present within narrower range.

Works With Zinc

According to the speaker, he did some work in zinc on a 3-inch mill in producing sheets for dry cells, Japanese had experimented with zinc on a larger scale, using Hazelett equipment already installed at the plant of the Crown Cork & Seal Co., Baltimore, and as a result they later purchased from him a 32-inch zinc mill for installation in Japan.

Throughout his experiments, said Mr. Hazelett, he has endeavored to attack problems by first working with metals of low melting temperature. Lead was the easiest of all to work with but he did not recommend his method for the processing of this metal as present costs of rolling are so modest and the capacity of the Hazelett mill is so great that economy would not justify the use of the process on sheet lead.

Mr. Hazelett stated that generally speaking he is confining his activities largely to the rolling of thin sheets. The only other product to be directly fabricated was wire and

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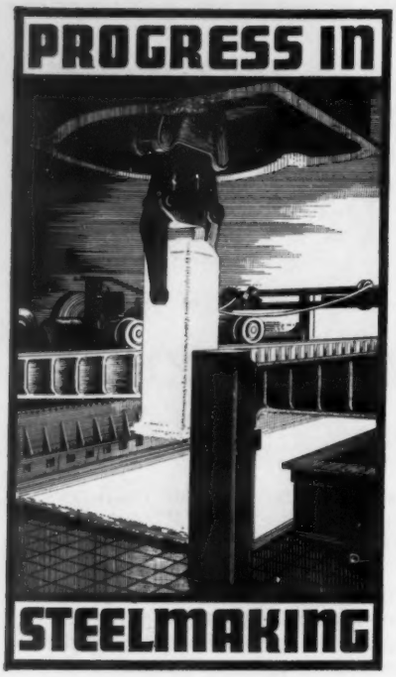

Pig Casting Machine

Double strand machine of improved design operates with economy, producing 1500 tons of 80-pound pigs in 24 hours with scrap loss of 0.5 per cent. Design permits lubrication of wheels and prevents wear on links

By C. P. CLINGERMAN

Superintendent, Carrie Furnaces, Carnegie-Illinois Steel Corp., Rankin, Pa.

■ IN JULY of 1936, a pig casting machine furnished by Pittsburgh Coal Washer Co., Ambridge, Pa., was put into service at Carrie furnaces, Rankin, Pa., of Carnegie-Illinois Steel Corp. This machine has operated satisfactorily and economically. It is a double strand machine and replaced two double strand machines of an older and different design. It produces 1500 tons of 80-pound pigs in 24 hours compared to 500 tons per 24 hours on each of the old machines. The scrap loss is very low, amounting to 0.5 per cent or about 7.5 tons in 24 hours' operation.

The molds are attached to links and wheels, which move along steel rails. Wheels are placed between two links and mounted on short pins. Pins are kept from turning by means of a lug cast on the links. Since the pins will not turn, there is no wear on the links and hence no bushings are required. The wheels are lubricated by means of a hole through the center of the pin from which there are several outlets into a groove in the middle of the wheel. A grease fitting is inserted in the head of the pin and all the wheels can be lubricated in several hours' time with the aid of an air operated grease gun. Mounting the wheels individually, instead of one at each end of a long axle, results in a flexible chain and no breaks occur. The wheels are 7 inches in diameter and are cast from high manganese steel, resulting in long life. The pins are made from chromium-nickel steel.

Molds Held Securely

Molds are attached to the links with plates, one bolted to each end of a mold. These plates slip through lugs on each link and the mold is held in position with a keeper plate, one end of which is tight against the mold. The other end of the keeper plate is held by a cotter pin which goes through the plate attached to the mold and which is tight against the link. The links are high manganese steel castings and measure 12 inches from center to center of the holes drilled for mounting the wheels.

Each strand is 165 feet from center to center of the sprockets and consists of 343 molds. The molds overlap so that any excess iron can flow back into the next mold with no loss. While there are many things to be said in favor of cast steel molds, cast iron molds have proved

A view of the sprocket wheels on the pouring end. The tail sprockets have take-up boxes which permit removal of a link when necessary

Cast in one piece, this ship rudder frame is a typical Birdsboro R-P* casting. Height 23′ 2″, width 7′ 6¾″, weight 12,300 lbs. Notice the thin section. The casting is true to pattern; has no fins and a minimum amount of metal was allowed for machining. Put your large and intricate casting problems up to Birdsboro.

* Randupson Process

BIRDSBORO
STEEL FOUNDRY AND MACHINE COMPANY
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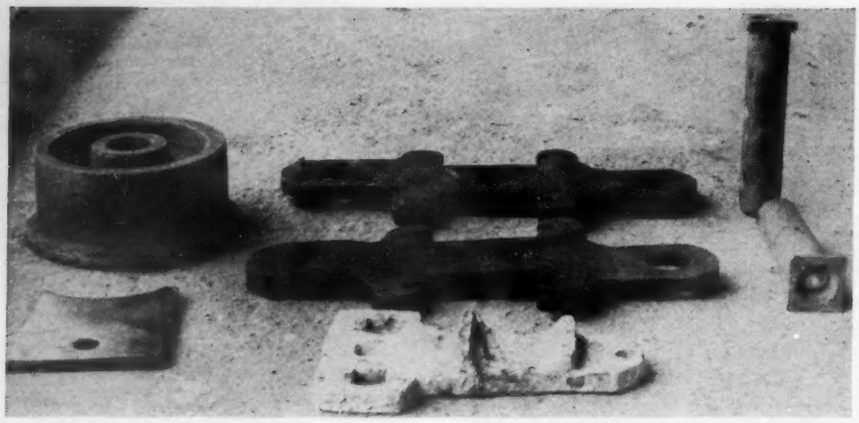


Parts of link and wheel assembly. Wheel is mounted on a short pin between two links; lugs on links keep pin from turning, eliminating wear on links and eliminating the usual bushing

very satisfactory in this installation. As long as the mold coating is of the proper thickness the number of molds used is not excessive.

The strands have a slope of $1\frac{11}{16}$ inches per foot which means that the iron is discharged at a height of 24 feet from the ground. This is an adequate height for loading cars. The iron is cooled by water sprays which extend for a length of 60 feet from the discharge point. Sprays also discharge into the cars. The head and tail sprockets are 4 feet in diameter and the tail sprocket has a take-up box which permits the removal of a link when necessary. For driving, a 50-horsepower, direct-current shunt-wound motor, located at the head end, is used with a variable speed control allowing the strand to be moved at a speed of from 20 to 50 feet per minute. Experience has shown that 28 feet per minute is the most suitable speed for good quality iron. Cars are placed on two loading tracks and are moved with a car haul equipped with a 25-horsepower, direct-current motor. A movable gate permits the loading of cars on either track. Discharge chutes are lined with USS abrasion resisting manganese steel plates.

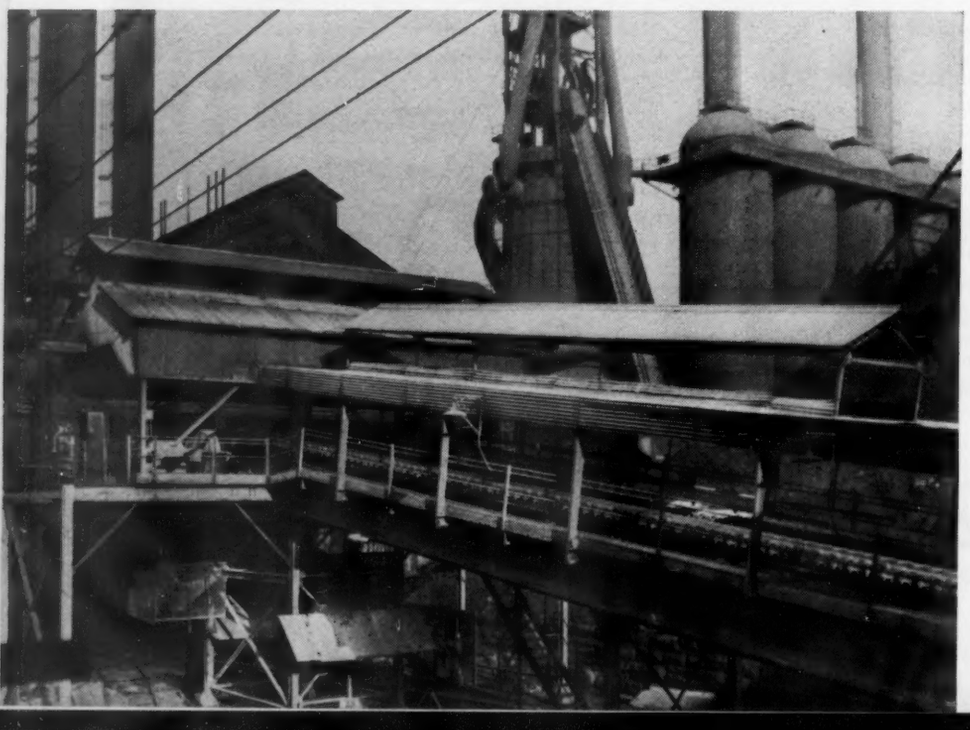
Use Short-Pour Ladles

Ladles used at this plant are of the short-pour type and hold about 40 tons. These ladles are placed in a cradle which is then raised by a crane. The hot metal pours continuously into a pot. The stream is divided by means of runners and it flows simultaneously into the molds on both strands. At the usual speed, a ladle is emptied in 20 minutes. The pourer is stationed so that he can see the ladle, the pouring spouts and the strand up to the head end.

Four men are required to operate the machine, one pourer for each strand, one man who loads the cars and one man who looks after the coating of the molds.

Molds are coated with burnt dolomite, Maglikote, which has proved very satisfactory. So long as the mixture is heavy enough, no undue trouble results. The molds are preheated on the return side when starting the machine. At the present time a coal-fired oven is used but an oil burner is expected to be installed in the near future.

Discharge end of new pig casting machine showing sprays on cooling system



Mill Drives Improved At Pittsburgh Plant

■ Four-high skin pass mills, which are used widely in this country for imparting a high surface finish and the proper temper to sheets, have been improved rapidly particularly as concerns the drive. At a plant in the Pittsburgh district rolling deep drawing black plate, the second 4-high stand has been added to its 42-inch skin pass mill. This tandem installation with its associated tension features is operated by 17 motors and generators. In 1926 high-grade sheets were given a skin pass on a 2-high single stand mill with mechanical tension devices which required merely a constant-speed motor for its operation.

Palm Oil Substitute Believed Developed

■ Now being tried out at several tin plate mills in this country is a substitute for palm oil. Many attempts to replace palm oil with other oils in the production of tin plate have been made heretofore but none ever proved successful. The new product, a development by a well known company, is said to have undergone extensive laboratory tests whose results give promise of its use, at least to some extent, as a palm oil substitute.

Engine Drive Replaced With Large Motor

■ Steam engine drive on a 3-high, 4-stand billet mill has been replaced by a large 4-speed, 440-volt motor. It has speeds of 1200, 900, 600 and 450 revolutions per minute. The horsepowers at these different speeds are 400, 300, 200 and 150. Resistor-type, reduced-voltage, magnetic, pole-changing control is used. The stator employs a single-turn bar winding.

♦

An interesting recent trend in the steel industry involved changing the magnetic control to adjustable voltage control on a skin pass mill for cold strip.

Business Ills Are Diagnosed by Doctor

■ A physician of our acquaintance reads this page with what we believe to be an effort to do some literary slumming.

Some of his comments on the state of business might be interesting to business men and engineers in the welding industry since they represent a point of view which is 180 degrees away from the views currently expressed by financial and economics column writers in general. His views may be broadly interpreted as follows:

The upswing of 1935-36 and early 1937 permitted business men more freedom from worry than they had exprienced for several years. They began to eat more and drink more and took on more weight. As they took on more weight, they became less active physically. Patients trooped into doctors' offices complaining of headaches, lack of energy and constipation. Business men began to read more but were less active in execution of ideas that occurred to them.

Presently they became obsessed with fears that the prosperity would not last or that the administration was ruining the country. Since they had acquired the habit of not doing anything about such ideas, they grew and festered until they dominated current thought. Whether the administration is right or wrong had little to do with the resultant mental condition of businessmen. The fact that they did nothing about their thoughts is responsible for their depressed mental condition.

To be healthy a man has to exercise his arms and legs as well as his mind and actually do something about the things he thinks about. If every important business man in the country would start tomorrow to walk five miles every day and take decisive action about what he thinks is wrong with his business and the country at large, the recession probably would be over in ten days.

The doctor's diagnosis might not be so far off at that. This thing of yelling bloody murder every time anyone tries to do anything in Washington, but not doing anything more about it, is getting to be pretty much of a bore. It just might be true that everyone would be better off if business men would go down to Washington and try to get the Great White Father to do the right things instead of so many wrong things and the business men themselves would feel better for trying to "do something about it." It may not be pleasant to be informed by a doctor that business men are full of the products of constipation but then again, it might be worth doing something about.

Removes Welding Smoke

■ Recent agitation of union business agents and state authorities has resulted in steps being taken to remove smoke produced by covered arc welding electrodes from buildings in which welding is being done. While there is no evidence that any case of silicosis may be traced to this source, it is likely the movement will cure bad ventilation in departments which should have been cured long ago.

The former practice of merely providing an exhaust blower is satisfactory in mild weather but in winter the system results in a cold shop unless heating facilities are greatly increased. The only need is to take the solid matter out of the atmosphere of the shop, and it seems quite likely that this may be done without exhausting the warm air from the shop to the outside. There is need for low priced equipment to perform this function.

Instrument Checking

■ Recent specifications covering arc welding of power piping required use of an archronograph or similar instrument to record quality of the weld as it was being made.

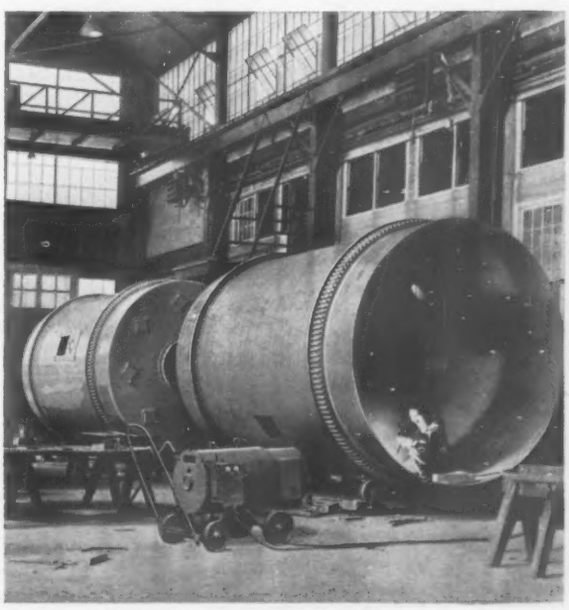
X-ray inspection of power piping welds is practically impossible where welds are made in the power plant. Indicating but not recording apparatus was recently announced by A. O. Smith Corp., for detecting defective welds as they are made. A Cleveland company may shortly announce new equipment in this field.

Without questioning the great value of X-ray inspection of welds, the logic of the new instruments cannot be escaped.

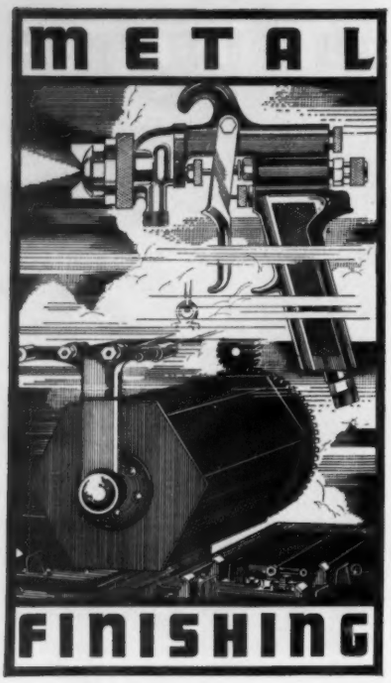
By ROBERT E. KINKEAD

On this page, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

There's Welding in Your Beer



■ **Use of arc welding enabled Galland-Henning Co., Milwaukee, to build 12 of these 600-bushel malt germinating drums at the rate of five, instead of three, per week. Each takes 400 lineal feet of welding, being of rolled steel plates from 5/16 to 3/8-inch thick. P & H-Hansen Smootharc welders and electrodes were used**



Galvanized Sheets

This product is finding a rapidly growing market in farm buildings, a development made possible because modern surface treatment methods afford lasting protection

By W. D. JAMES
President, James Mfg. Co.
Fort Atkinson, Wis.

■ A TREND of growing importance to the iron and steel industry is the rapidly increasing use of metal-clad farm buildings. An estimated toll of $400,000,000 is taken yearly by effects of fire, wind and weather on American farm buildings. Fires alone cause a total loss well above the $100,000,000 mark. Use of metal-clad buildings reduces this loss from two angles. Spontaneous combustion fires are eliminated by the well ventilated structures now possible at no increase in cost and fires caused by lightning are prevented since properly erected metal buildings afford effective protection against lightning. Losses from windstorm and maintenance costs are reduced, also.

United States department of agriculture estimates there are 6½-million farms with 48 million buildings in this country. With their contents of produce, livestock and machinery, the insurable value is estimated at over 23 *billions* of dollars, figures indicating the importance of farm buildings.

In addition to their desirability from the standpoints mentioned, there is an increase in the use of metal-clad farm buildings due to the following factors: Sufficient development work has been completed to show the effectiveness of the materials and surface treatment in producing a structure practically impervious to deterioration. Adequate experience in design and construction has made it possible to produce and erect a complete set of metal-clad farm buildings at costs comparable to ordinary farm buildings of equivalent capacity.

One of the pioneer companies in this field is the James Mfg. Co., Fort Atkinson, Wis. It has been producing metal-clad farm buildings and equipment for 30 years and now occupies four plants with 13 acres of modern plant where a full line of metal barn and poultry equipment, litter carriers and ventilating systems are made in addition to metal structures of types suitable for all animal housing and crop storage requirements. Also, a complete line of metal roofing, siding, sheathing and trim is made for use in cladding existing as well as new structures.

Jamesway iron clad farm buildings employ sheets of commercially pure iron alloyed with the correct amount of copper to provide maximum resistance to corrosion. To this inherently rust resisting material is added the protection afforded by a heavy coating of zinc spelter applied in a hot galvanizing bath after the sheets have been trimmed and formed. The zinc coating is of utmost importance as upon it depends the life of the entire structure. Therefore it must be uniform and of sufficient thickness to provide permanent protection.

One of the advantages of metal clad buildings is the reduction in maintenance expense entailed by elimination of painting and repainting. However, as the zinc coating is relied upon for full protection to the surface without the aid of paint, it must not be so heavy that it fractures or flakes off during erection or in heavy storms.

Roofing, siding and sheathing sheets for Jamesway structures contain a formed pattern to add strength and to improve appearance. This consists of large vertical ribs spaced every 6 inches; running vertically between are five or six small corrugations. Illustrations show the pleasing design produced.

Fig. 2 demonstrates the construction employed in joining the sheets. The special non-syphon feature of this joint keeps moisture from en-

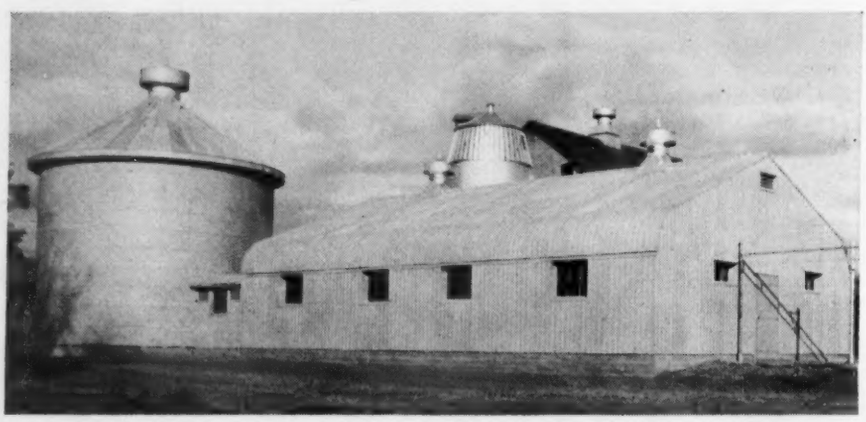


Fig. 1—Typical farm buildings of metal clad construction

tering the building by capillary action through the joint. In conjunction with the heavy ribs formed in the sheet, this interlocking joint produces a strong, rigid, tightly matched covering. The illustration also shows the special nail used in this construction. It is of iron, hardened to easily penetrate the sheets and fitted with soft lead under the head to produce a tight seal around the hole in the metal. Upper section of nail is zinc coated. Lower section is uncoated and is provided with a screw shank to assure adequate holding power.

Sheets may be applied on outside surface of the structure or both outside and inside. When applied on the inside surfaces as well, they help to

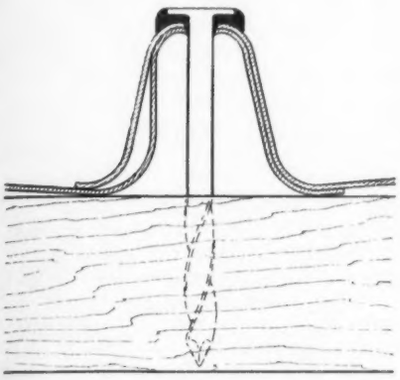


Fig. 2—Non-syphoning lap joint used in iron clad construction to prevent water getting through lap by capillary attraction. Note special nail

control the effects of moisture in the building, a problem connected with housing farm animals caused by the high humidity which prevails in their quarters and which usually results in rapid deterioration of ordinary wood surfaces.

Iron clad wall, ceiling and roof areas make effective insulation possible at lower cost as this construction readily lends itself to the use of non-processed insulation such as sawdust, mill shavings and similar materials. Typical designs possible are shown in Figs. 4 and 5. As the effectiveness of any insulating material decreases rapidly when moisture enters, iron clad construction with waterproof paper as shown in Fig. 4 is particularly suitable where used with insulating material as it forms an effective protection.

Fig. 3—Carefully galvanized surfaces are practically immune to effects of high humidity in live stock quarters

Restoring Old Structures

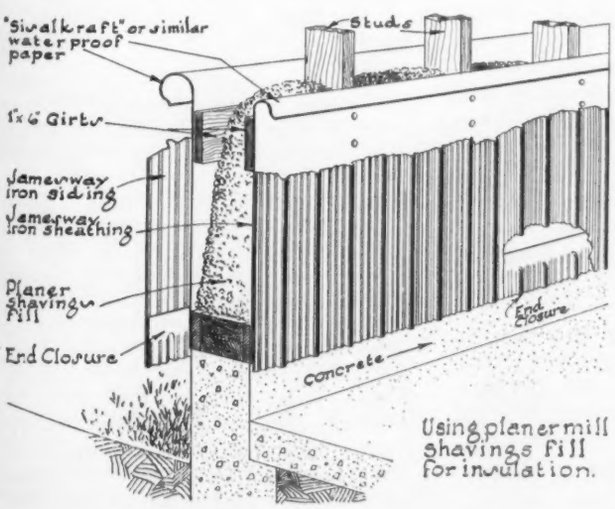
Reclaiming or modernizing old structures by an application of iron cladding also is another use for this material coming into wide favor. Structures badly deteriorated can be restored to weather tightness and good appearance at reasonable cost by iron cladding. In fact, it is estimated that the cost of two ordinary paint jobs on a structure will pay for iron cladding it. Once clad, of course, no more paint is required during the life of the structure so the cladding produces a good return on the investment.

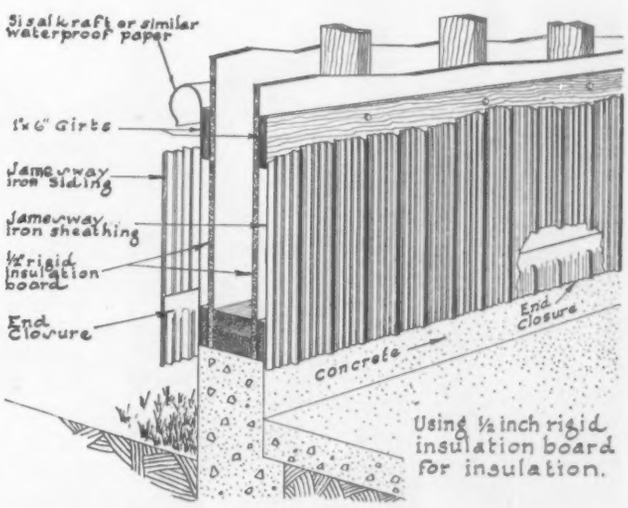
In Jamesway hay keepers, vertical cylindrical structures, sheets with ventilating louvres are used on the inside surface and on the central vent shaft to afford efficient ventilation. These sheets also are made from iron alloyed with copper and carefully galvanized for surface protection.

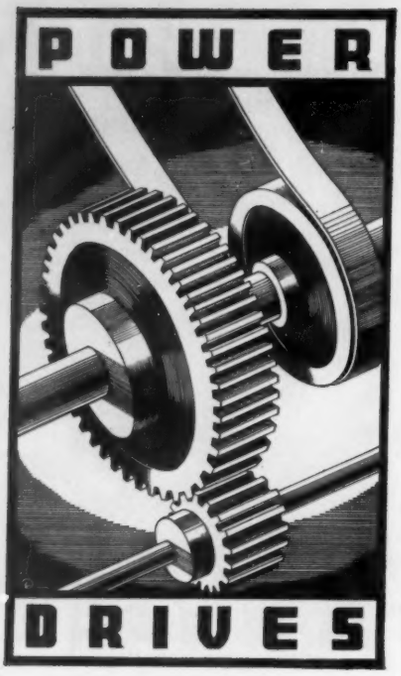
Malleable iron hinges, latches and other fittings are used with the iron clad construction. Steel sashes are fabricated by welding and are protected by a suitable zinc coating. A series of doors of various sizes employs heavy angle iron frames, a core of 1-inch rigid insulation board and covered with a 1-piece iron-copper alloy sheet, heavily zinc coated and provided with deep vertical ribs. Doorway frames are heavy angle iron. A complete line of iron window and door casings, jambs and sills are made as well as corner trim, hip flashings, eave valleys, ridge rolls, etc.

With this equipment, implement sheds, hog houses, poultry pens, horse and cattle barns, dwellings, crop storage buildings of many types and all other farm building units now can be iron clad at comparatively low cost to give effective fire, windstorm and lightning protection as well as to eliminate use of paint.

Fig. 4 (Left)—Design with untreated insulation. Fig. 5 (Right)—Design for use with insulating board







Drive Insurance

Here's an idea one plant had—maintenance crew does the servicing, trouble crew does the repairing. And the maintenance man is held responsible for trouble

■ THE PLANT engineer in a large plant has a maintenance or servicing crew and a repair or trouble crew. The maintenance crew devotes all of its time to inspecting, adjusting or lubricating the electrical and mechanical drive equipment. Whenever anything fails, or the maintenance man finds that some part of the drive or control requires replacement or more work than he can do in a minute or two with his pliers and screwdriver, a trouble man is called. Production machines are under the control of the different department heads.

Each maintenance man has a definite part of the shop to cover and is held responsible for any failure or trouble due to his neglect. Thus, he knows what equipment requires daily or frequent attention.

No work is scheduled for him as his daily contacts soon establish requirements. Knowing that he is responsible overcomes any likelihood of neglecting or shirking in his daily routine. The only reports he makes are on equipment which is beginning to show signs of trouble, such as a bearing running hot, a loose belt, a control with burned points or other worn or defective parts. Such repairs should be made soon but not necessarily immediately.

If the trouble indicates probable early failure or a dangerous condition the trouble man is called by telephone, a clear explanation given of the difficulty and the repair or replacement parts necessary to put the equipment in service listed. In this way the trouble man can take with him all parts, tools and men neded to make the repairs.

Diagnoses Damage

In case of a failure or stoppage the foreman calls the maintenance man, if he is within the department, to diagnose the amount and kind of damage and then summon the trouble man. Otherwise, the foreman calls the trouble department direct, explaining as well as he can what has happened. This amateur diagnosis is seldom as satisfactory as when the maintenance man handles the call.

All calls are made to the clerk handling maintenance stores and records, who is always in his office and knows where trouble men have been sent so he can call one of the maintenance men or take a trouble man away from a less important task.

Work is set ahead for the trouble crew so that they are not idle while waiting for calls. One duty is to make all changes, shifts of equipment and erect new work. Other tasks are to repair and overhaul equipment, prepare material for equipment changes and new installations. This keeps some of the men in the shop all of the time. The man who rewinds coils on motor repair is always in the shop and is the last man called, then only in case no one else is available.

The clerk keeps a record of all of these emergency calls. The plant engineer requires a report from the

Chain for Ol' Man River

■ **This roller chain, made by Chain Belt Co., Milwaukee, for gate control at Dam No. 17, Mississippi River development, weighs only 300 pounds to the foot, with an estimated ultimate strength of over 2,000,000 pounds. It is 102 feet 7½ inches long—within $\frac{3}{32}$-inch of calculated length. Pins are 5½ inches in diameter, within 0.001 inch, and side bars are of 1 and 2-inch plate, 8¾ inches wide. Both are of chromium-nickel alloy steel**

trouble man as to the condition, extent of repair and probable cause. The maintenance man also must report why he had not located impending trouble and corrected or reported it.

It is recognized that sometimes failures occur which do not show any signs beforehand. This plant engineer estimates that the maintenance men locate and correct or report between 90 and 95 per cent of what would result in failures if neglected and decrease by that amount the number of stoppages.

The plant engineer believes that it would be profitable to assign two electricians and a mechanic-millwright to the trouble crew even though they had nothing else to do. Their most profitable time would be when they were waiting with nothing to do; they are most expensive when answering an emergency call. However, careful planning of their work gives them sufficient in-between-times tasks to keep them profitably employed while waiting a call.

Through the co-ordinated operation of these two groups in preventing stoppages and getting any unforeseen difficulty corrected quickly the plant engineer is convinced that he has established an economical and profitable drive insurance.

Timing of Machine With Drive Important

■ Any golfer knows the meaning and importance of the "follow through" in his game. The "follow through" on the drive to machines is just as important. Unless the drive is timed to the pace of the machine, even though several thousand dollars are spent on a new machine to increase production, the desired output is seldom obtained.

In the past, to meet competition many machine manufacturers sold the bare machine and expected the user to install his own drive. Recommendations were made, to be sure, but these were not always followed. This practice was like selling an automobile without the engine and expecting the purchaser to get the proper engine, when, as a matter of fact, he might decide to use an engine from an old car.

Unfortunate experiences have taught many machine manufacturers that the drive and its control are such integral parts of the machine that they require designing as a part of the machine. From the user's standpoint purchasing as a complete, compact, finished unit permits immediate installation without going to the trouble of purchasing and mounting individual motor and control equipment. Also the user is assured that the complete assembly as received will function as guaranted by the manufacturer. This assured satisfaction also benefits the manufacturer.

With the modern machine, provided it has proper drive and control, an entire sequence of motions and operations may be performed automatically in a fixed routine with individual operations timed to fractions of a second. No operator could control operations with such accuracy. He would have to spend much of his time operating with less time to feed and remove work.

At one time the incorporation of variable speed units in a drive was almost entirely up to the customer. Today many machine manufacturers incorporate variable speed units into their products as standard, or at least, optional equipment. One manufacturer of press brakes, who offers variable speed as optional, states that about 50 per cent of the orders specify variable speed drive. With the rate of increase, if maintained, the variable drive may become standard and the fixed speed drive an optional unit, he stated. Manufacturers of many special machines are also incorporating variable speed drives to permit maximum production with diversified dimensions or grades of product or material.

Milling machines, boring mills, planers and welding units are only a few of the many other applications of modern automatic control whereby the machine manufacturer has "followed through" to provide maximum utility to his product and assure production at full capacity.

♦

Regular and systematic cleaning of lamps and reflectors is one item of maintenance cost which cannot be neglected if full illuminating value for current used is to be obtained.

♦

Careless installation is a common cause of improper operation of a drive. For example, a silent chain drive produced a regular click and jump at certain points as the chain passed over the motor sprocket. Investigation showed that the mechanic-millwright had omitted one of the pin bushings in connecting up the chain. When the chain was properly bushed at the joint it operated without further noise or trouble.

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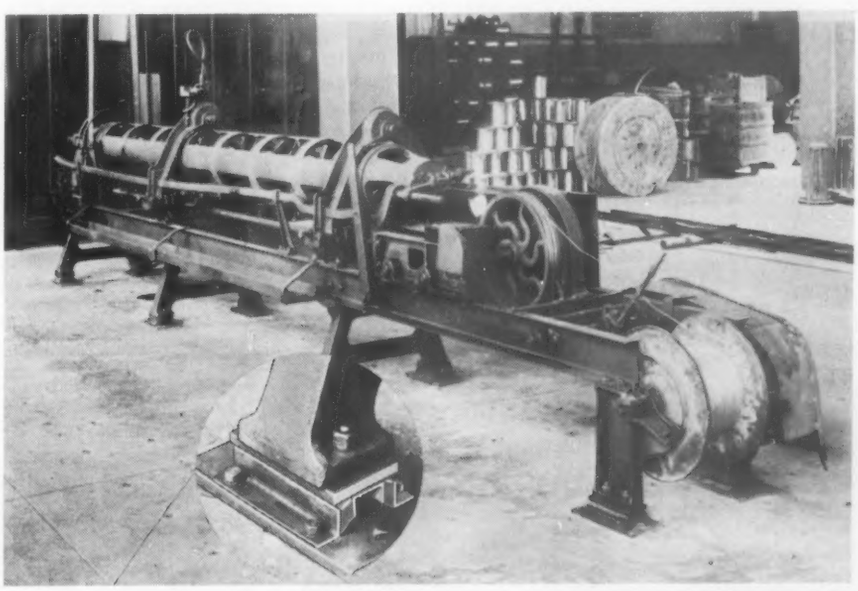
Many wiring installations are eyesores; rearranging in neat, orderly layout not only permits following circuits through more quickly and safely in an emergency but also produces fewer emergencies.

Noise Eliminated by Rubber Mountings



■ **Noise and vibration from this 1500 revolutions per minute, high-speed strander in the plant of Simplex Wire & Cable Co., Boston, has been eliminated through the use of rubber mountings made by B. F. Goodrich Co., Akron, O. Vibro-Insulators are of the double shear rubber-to-metal type designed to support load of 50 pounds per square inch. Since strander weighs approximately 2500 pounds, it was necessary only to mount a Vibro-Insulator 6 inches long under each of the eight legs**

NEW EQUIPMENT

150-Pound Pressure Maintained In Dryer

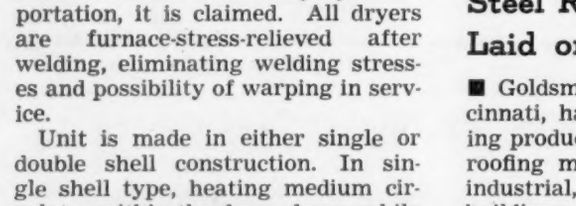
■ Lukenweld Inc. division of Lukens Steel Co., Coatesville, Pa., is introducing a welded steel dryer for use in paper, soap, pharmaceutical, textile, chemical and other industries which operates with steam or other heating media, and is capable of providing controlled steam distribution at pressures up to 150 pounds.

Dryer can be manufactured in all sizes up to 15 feet in diameter with shell face size limited only by transportation, it is claimed. All dryers are furnace-stress-relieved after welding, eliminating welding stresses and possibility of warping in service.

Unit is made in either single or double shell construction. In single shell type, heating medium circulates within the dryer drum, while in the double shell construction, steam enters through a journal at one end, passes through inlets in the channels welded integrally with spokes of dryer, and confined in compartments in jacket formed between inner and outer shell.

Each compartment is individually supplied with steam. Condensate is automatically and continuously drained off through outlets in channels welded integrally with spokes. Outlets and inlets converge at a revolving steam joint at the end of journal.

In both single and double shell dryer, outer or drying shell is made from a close-grained steel which can be machined, ground and polished. Dryer can also be furnished with nonrusting chromium plated shell. This new dryer is claimed to be lighter in weight and dries uniformly.



Shell of this Lukenweld steel dryer is chromium - plated. It is 6 feet in diameter and maintains uniform drying with lower steam consumption

Steel Roofing Is Laid on Purlins

■ Goldsmith Metal Lath Co., Cincinnati, has introduced a new roofing product called Metrodeck, a steel roofing material which is used for industrial, institutional and theater buildings where metal purlins are spaced from 5 to 6 feet apart.

Metal deck is made with ribs 1½ to 1¾ inches deep, depending upon span and load carried. Ribs are tapered to permit lapping and telescoping of one sheet within the other endwise.

Roofing is attached to purlins by means of purlin clips. Clip consists of two parts welded together; horizontal portion that is bent around flanges of purlin and a welded vertical portion with two openings. As roofing is laid upon the purlins

Metrodeck roof metal is simply laid. Ribs of roofing are tapered to permit lapping or telescoping one sheet within the other endwise

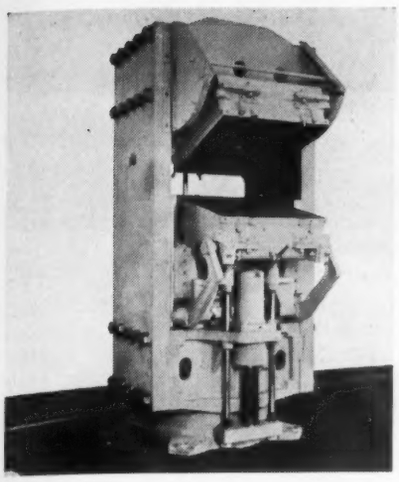
longitudinally, the first opening of the purlin clip is placed over the upward portion of the full rib on one side of the sheet and the horizontal part of the clip is bent around flanges of purlin. Half rib of adjacent lateral sheet is then placed in the second aperture of clip. Part of clip then extends vertically above the top surface of the deck and is bent at a right angle flat against deck. Clip attaches deck to purlin and also locks sheets together.

When spans exceed 4 feet an intermediate clip is furnished for locking sheets together laterally. Intermediate clip is placed in identically the same manner as purlin clip excepting when adjacent sheets are placed within both apertures of the clip. Clips are not required if welding is used.

Molds In Quantities

■ Lake Erie Engineering Corp., Buffalo, has introduced an automatic hydraulic molding press for quantity production of molded plastic and rubber parts.

Machine has hydraulic type, tilt-



Lake Erie molding press has a rated capacity of 1000 tons for molds measuring 38 x 38 inches

ing head press with automatic multiple ejection of molded forms. Press has a rated capacity of 1000 tons for molds measuring 38 x 38 inches. Automatic operation has made it possible for one man to operate 4 presses. Mechanical molded rubber goods and plastic parts such as pedal pads, castors, gear shift knobs and electrical parts, can be turned out in volume production quantities.

Drills Stainless Steel

■ Black & Decker Mfg. Co., Towson, Md., is announcing the production of a ¼-inch low-speed electric drill which is adapted to stainless steel, monel and other hard metals.

Drill has spindle of 450 revolutions per minute and a universal motor operating through a triple-reduction gear train which provides ample torque for steel drilling. Armature and spindle are mounted on ball bearings. Unit is equipped with a keyless chuck and gear locking pin to facilitate changing of drill bits.

Overall length of unit is 13 inches. It is furnished with a 3-conductor cable and plug, trigger switch with locking pin and alternating current or direct current universal motor. Weight is 6¼ pounds.

Uses Pneumatic Cushion

■ Marquette Tool & Mfg. Co., 1420 Hastings street, Toledo, O., has introduced a pneumatic slide cushion for die presses, which is mounted under the slide and can be used in conjunction with blanking, drawing and curling dies to replace the springs or rubber cushions. These cushions can also be used for stripping and blankholding operations.

According to the makers, the function of this cushion as a stripper has a number of advantages. Jacking back the stripper plate against stiff springs is unnecessary when setting dies. Air is released from the cushion and stripper plate slides back out of the way. No springs are used. Positive control of stripping is also provided so cushions will operate at the correct moment.

It is possible, it is claimed, to convert a single-action press into a triple-action press with the use of slide cushions and regular cushions in the bed. Cushion and draw ring proceed down together, blanking and drawing the shell. Upper ring recedes while the lower forming die, actuated by air cushions, pushes upward against the top of the cover. When edge is completely curled, slide cushion recedes with upper draw ring while the lower forming die ejects the shell. Slide cushion must be the same length as the edge curl. Cushion is connected with air supply by a flexible hose. Usual sizes are available.

Improves Machine To Straighten Wires

■ Kane & Roach Inc., Syracuse, N. Y., has recently prepared for the market an improved No. F 5-roll core wire straightener which is designed for removing sharp bends and kinks from core wire on a high production basis, and placing the stock in a straightened condition. It is claimed the machine economizes in cases where foundries find hand straightening costs so high that they scrap the wire.

Frame of machine is of box form construction and top plate extends the full width of frame. Cast iron oil tight gear box embodies roll shaft and reduction gearing. Frame is mounted on cabinet type base with platform extending under the roll shafts for the full length of machine. Pinch roll shafts are furnished with outboard bearings and are spring loaded allowing for slight variation in the gage of wire.

Main drive shaft is mounted in anti-friction bearings. Bronze sleeve type bearings carry all other shafts. Intermediate and roll shaft gears are hardened cut steel. Roll shafts are chrome nickel steel, heat treated, machined and ground. Connection to electric motor is made through medium of a chain drive, which is enclosed by a guard.

New Shear Line Added

■ Niagara Machine & Tool Works, 637 Northland avenue, Buffalo, is announcing a new line of power squaring shears which are built in 6, 8, 10 and 12-foot lengths for flat shearing of 3/16-inch steel and 14 and 11-foot lengths for 10-gage steel.

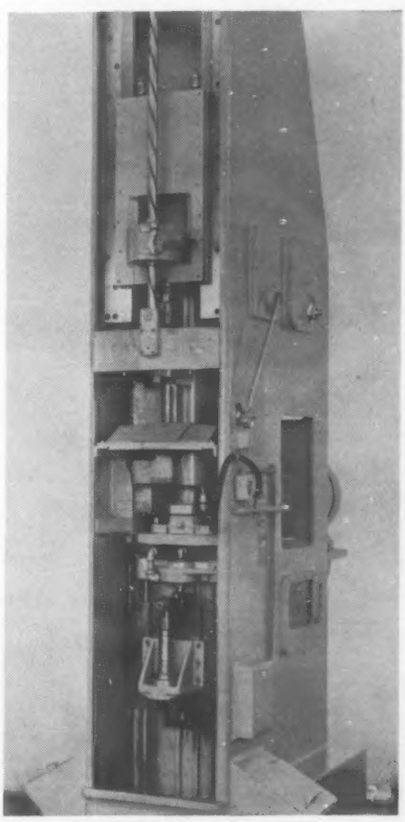
Triangular section crosshead with low slope, enclosed drive mounted on antifriction bearings running in oil, 14 point engagement sleeve clutch with built-in single stroke mechanism and alloy steel knives are some of the features included in the line.

Machine Broaches Both Gears and Pump Bodies

■ Colonial Broach Co., Detroit, has placed on the market a vertical, pull-up type, broaching machine capable of broaching both spiral internal gears and five different sizes of pump bodies on the same machine.

Machine is a standard VG1-10-48 with a 48-inch stroke and 10-ton capacity. The spiral bar in front of the machine rotates the broach during broaching of internal spiral teeth on the gears. Spiral bar can be instantaneously disengaged by means of a lever which is near the bottom of the bar on the ram head. The machine is provided with a variable speed control; broach handling is completely automatic.

After the part is loaded into the fixture, the machine brings broach up from the bottom to engage automatic puller in the ram which trav-



Front view of Colonial VG1-10-48 broaching machine with 48-inch stroke and 10-ton capacity

els on hardened and ground ways. Broach is pulled through the work, machine stopping at the top of the stroke. After part is removed and broach is returned into the base of machine and released, machine is reset for reloading.

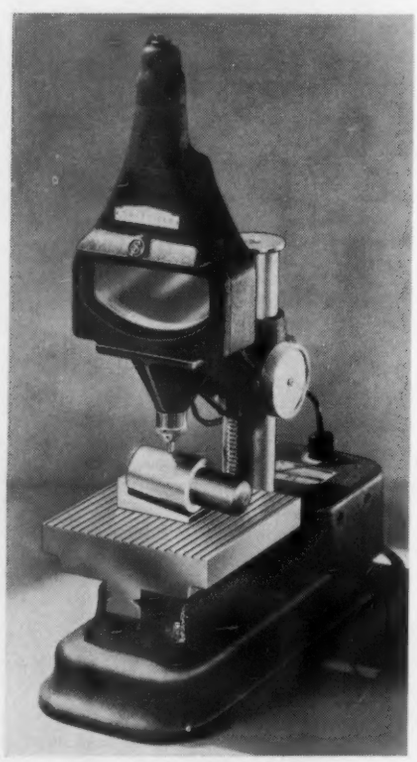
Chips are dropped into the base of machine where they may be removed from either side. Stroke is adjustable so that a shorter stroke may be used on pump bodies.

Device Is Accurate In Checking Gages

■ Sheffield Gage Corp., Dayton, O., has introduced a checking device to check tapered plug gage dimensions, and also remove the varying human element in checking and obtain more accurate results.

Instrument has a plain horizontal bed. One end of this bed is equipped with an adjustable anvil and at the other end is a visual gage head.

In checking the small diameter of a tapered gage, precision gage blocks equivalent to the true diameter of the small end of taper are stacked on the horizontal bed between the adjustable anvil and gaging element. Standard gage roll is then placed tangent to each end of this stack and adjustable anvil moved up so as to bring blocks and rolls into contact with gaging element. Enough pressure is developed by the adjustment of the gage to place the shadow on the visual dial face at zero.



Sheffield visual gage is being used to check taper angle of a taper plug gage with a master angle block

Actual small diameter of gage is read directly by substituting it for the stack of blocks. The shadow on dial face indicates exactly how much this diameter is under or over size. Value of taper angle of plugs is determined by using a standard visual gage in conjunction with a master angle block.

Block is wedge-shaped and used as a fixture to hold tapered plug on the anvil of visual gage. Angle between base and hypotenuse of wedge is equal to the entire included angle of the taper. With tapered plug lying along this hypotenuse its upper side will be horizontal if its dimensions are correct.

Setting visual gage at zero at a point on the small diameter of the taper which has already been checked, plug and block are slid longitudinally under spindle of visual gage until large end is reached. Thus any variation in true taper is read directly on gage dial. If shadow remains on zero from one end of plug gage to the other, taper is correct. Master angle blocks are available for all standard tapers.

Sander Aids Crane

■ Lintern Corp., Cleveland, has introduced sanders for cranes which sand the rails in both directions insuring quick stopping and spotting.

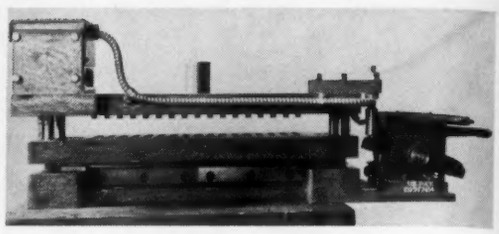
Sander is mounted above the rail and controlled by a momentary contact switch located in the cab. Pressure at the switch results in the proper amount of sand being applied to the rail instantly. Both rails are sanded at the same time thus giving even traction.

Sander is constructed to meet severe operating conditions. Parts are of brass and malleable iron. The hopper, which is 12½ x 12½ x 17 inches, is fabricated of 14 gage galvanized iron.

Magnet coil insures continuous operation. A heater is used to heat the air chamber and keep the sand dry for instant flowing. Removal of pressure from contact switch automatically closes the sander valves.

Control Device Patented

■ S. B. Whistler & Sons, 752 Military road, Buffalo, has just secured a patent on a control device, adaptable to all types of machinery, particularly presses.

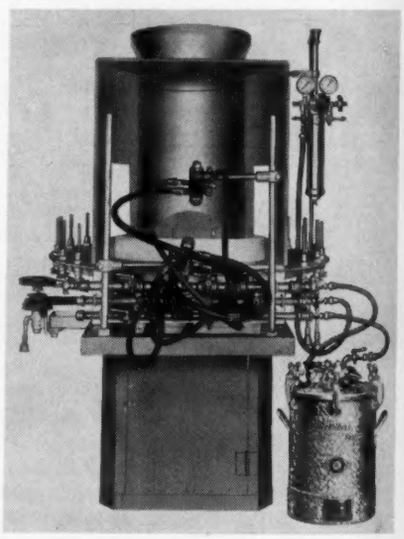


Control unit is located at the right of automatic cut-off die. Device is controlled by ball bearings

Illustration shows the control unit at the right operating an automatic cut-off die for variable lengths. Ball bearings control device. If, for example, a die is to be cut off every sixth stroke of the press, 5 small ball-bearings and one large is put in control tube. This tips a mercury switch which is connected with a solenoid. Action of solenoid may control a set of slides, levers or devices which may be connected to them. Balls may be put in rotation setup or any desired number.

Finishing Machine Has Rotary Spray

■ DeVilbiss Co., Toledo, O., is introducing a rotary spray finishing machine, type YB, for high speed automatic finishing of small and medium articles. It is claimed machine is capable of an approximate production of 3600 small light weight articles per hour.



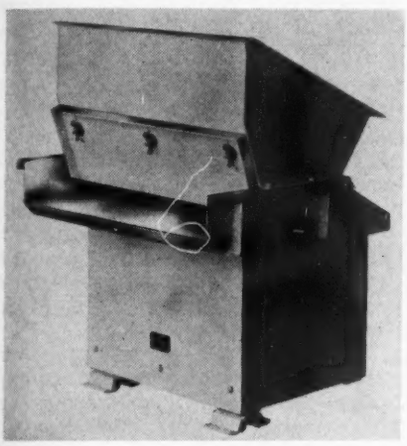
Spindles of this DeVilbiss rotary spray are rotated by belt with automatic take up device which is driven by a V-belt.

Spindles, automatic spray gun, automatic control valve, hose connections and other accessories of a modern finishing unit are included as equipment. All machines are equipped with an improved speed

reduction unit, and may be operated at several different speeds depending on operation requirements. If desired machine can be provided with a cam so spray gun operates at every second spindle when used to finish larger articles. Turntable is driven by a ¼-horsepower electric motor, speed of which can be regulated. From 15 to 50 spindles can be accommodated. Exhaust chamber and drying oven can be furnished, if desired.

Vibratory Feeder Is Made of Stainless Steel

■ Syntron Co., 370 Lexington avenue, Homer City, Pa., has placed on the market a vibratory feeder



Movement of material in this inspection machine is in a single layer flow by vibration. Rheostat controls speed of flow

for feeding small objects on a wide, moving inspection belt. Objects from nuts, washers, buttons, to candy pieces and vegetables such as peas are handled.

Feeding is accomplished through a wide trough, very short in length, with a receiving hopper having an adjustable gate. Vibratory movement controls material in a wide, single-layer flow so material is spread out on the belt in an evenly spaced manner claimed to make inspection easier. Flow speed is controlled by a rheostat in a separate wall-mounted controller furnished with feeder.

Machine is built of stainless steel. There are no moving parts such as motor, gears and cams to require lubrication and maintenance. Power from a common 110 volt, alternating current is sufficient for operation.

Pilot Operates Valve

■ C. B. Hunt & Sons Co., Salem, O., has introduced a pilot-operated, hydraulic, bronze valve which is suitable for oil, water or corrosive liquids up to 200 degrees Fahr.

Design of the valve embodies the no metal-to-metal wear principle. The employment of a drop forged bronze housing, it is claimed, is an additional factor for long life with water and corrosive fluids.

Valving operation is accomplished in the 2-way valves by only one moving part. In the 3-way and 4-way valves, it is accomplished by coincident motion of the two valve bodies or plungers. Plungers are free-floating in packings, avoiding metal-to-metal contact. Balanced port action in conjunction with the valving ring is a feature of the valve.

Accessibility is such that complete inspection, replacement of parts and assembly can be made in a few minutes without disturbing the hydraulic piping. Connections are provided so piping may be permanently connected above or below housing.

Valve bodies or plungers are made of stainless steel. Valves are made in ½-inch, ¾-inch and 1-inch sizes, and in two styles, for 1000 or 2000 pound working pressures.

Belt Carrier Made Of Standard Piping

■ Stephens-Adamson Co., Aurora, Ill., has developed a new standardized pipe-frame belt carrier made for industries where light conveyors are required. Rigid truss-type frame is supported on two parallel pipes instead of conventional structural steel or bulky timber stringers. Carrier brackets are clamped to pipes without boring holes and carriers can be shifted whenever necessary. By using standard piping, a sturdy conveyor frame can be quickly assembled.

Rocker type mounting permits carrier to tilt in either direction with the travel of the belt. Thus even a reversible direction belt is centered on carriers without the use of guide rollers. Cartridge type bearings are used. Conveyor is of the three roll design in which the outer rolls are inclined 20 degrees for maximum capacity.

Coils Made to Order

■ Sleeper & Hartley Inc., Worcester, Mass., has developed a No. 1 Universal spring coiler for making spiral wire in any length which subsequently may be cut to length.

Coiler has a built-in quick-change gear box which decreases set up time through the elimination of pick off change gears. Placing gear box levers in neutral changes machine to a continuous coiler for running out long lengths of coil. All gears are hardened. Cam hubs are fabricated of hardened and ground steel. For further convenience, pitch and diameter and variable speed control handles have been extended to the outside of the machine.

Machine is equipped with anti-friction bearings and a standard drive. Wire feed is from 2¼ to 435 inches. Rate of production is 95 springs per minute. A 1 horsepower 1200 revolutions per minute motor is recommended.

Unit Is Adaptable

■ Speedmaster Co., 1301 Washington avenue, Minneapolis, recently placed on the market a new transmission unit adaptable to various speeds. Output shaft of unit has a ratio of 45 to 1, it is claimed.

Shaft can be coupled directly to the product that is to be driven; or any standard V-belt may be used on the pulley. A speed indicator, built into the unit, is placed in a convenient position to show exact speed of running shaft at all times. Handwheel on the cabinet controls a toggle lever of the pulleys for changing speeds. A ½ horsepower motor is mounted on the top of the unit. However, it may be mounted in various positions.

Output side pulley of this Speedmaster transmission unit has a speed range from 90 revolutions per minute to 4300 revolutions per minute. Handwheel controls speed setting

Direct Rolling Process

(*Concluded from Page 47*)

he described that as a sheet of rods separated by thin fins.

He discussed various mechanical difficulties, such as folding and segregation, and described complications arising from freezing of the metal film, asserting that the frozen surface of metal does not travel as fast as the roll. He also described an installation with equipment for producing copper seamless tubing from the molten metal. At first the sections were only three to four feet long, but now 20-foot lengths with ⅜-inch wall can be turned out. Processing of aluminum alloys has presented serious problems, he said.

His early experimental work included the processing of thin antimonial lead sheets for storage batteries—this more than 14 years ago. He also worked on low carbon steel at the mill installed in the Huntington plant of International Nickel Co., producing strip in 1000-pound coils. Experimental work in the rolling of nickel and monel at this plant was described as leading to good results but the surfaces were not of high quality. Incidentally, the rolling of copper by Hazelett methods was first done on the mill at the Huntington plant.

Mr. Hazelett showed pictures covering more than 15 years of experimentation. Development of the present Hazelett mill is entirely a matter of the past four years, he said. Advisability of entirely new methods in the handling of molten metal is clearly indicated, he added. Many of his more recent experiments have been conducted on a new mill installed in his laboratory last summer.

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Research in Welding Flame Temperatures

■ *High Temperature Welding Flames*, by D. Seferian; cloth, 51 pages, 6 x 9¼ inches; published by Penton Publishing Co. Ltd., London, England, and supplied by STEEL, Cleveland, for $1.

This volume has been translated from the French by N. F. Daniel, and contains a preface by M. G. Ribaud. As the title of the book indicates, it is concerned with the actual temperature of the various types of flames used in welding, and while the work is of a scientific nature, it gives much practical information on flames used before welding.

The book is divided into three chapters, of which the first deals with the specific heats of gases at high temperatures and discusses such phases as the classical theory, and the new theory of specific heats of gases. Chap. II discusses dissociation constants for flame constituents and describes calculation of dissociation fractions for diatomic gases, and triatomic gases. Chap. III relates to welding flames and gives detailed information on the oxyacetylene flame, the investigation of hydrogen flames including the atomic hydrogen flame, and the oxyhydrogen flame, the calculation of flame temperatures for other hydrocarbons including the oxygen-methane flame, and the oxygen-butane flame, a new method for the determination of flame temperatures, and the oxyacetylene flame as a photometric standard.

Research Discussed

■ Functions of industrial research and development organizations, scope of technical information and the collection and storing of information are the main points of discussion in the recent issue of the International Tin Research and Development Council, publication No. 6, entitled "The Role of Technical Information in Industrial Research and Development," by C. E. Homer and E. S. Hedges. The council's past publications are listed.

Fits Equipment to Job

(*Concluded from Page* 46)

the load being supported on the first and third and blocked up adequately on the second, much in the same manner as exceptionally long and bulky shipments are carried on railroads. Formerly, it was necessary to have this sort of special haulage work done by outside contractors, thus a tidy saving was effected by this extra service from the heavy trailers.

In addition to the tractor-trailer system, other interesting features are to be found in the materials handling system at the Rustless plant. Storage of raw materials is arranged for speedy handling, both into the storage areas and out to points of use. Beneath the new craneway, careful separation of various classes of materials has been arranged. This was not an easy task for in the making of stainless steel as many as 15 different alloys must be kept on hand. Principal materials in the storage pile are scrap iron and chrome ore. In addition to space for the principal alloys, it is necessary to provide for storage of limestone, dolomite, grinding dust and other items.

Large Yard Areas Paved

By paving the entire yard area surrounding the storage areas, and also constructing similar pavements to connect various buildings, two major results are achieved: First, smoother transport of materials from storage areas to points of use with general improvment in yard handling; and second, cleanliness of entire yard and plant.

Over the aforementioned storage area, the craneway extends for a length of 650 feet and a span of 80 feet. On it operates the two electric traveling cranes, one of 10-ton capacity, the other one having been originally of that same capacity but now reinforced and equipped with a 15-ton trolley.

Scrap is handled in a novel manner. Turnings, croppings, etc., produced in various departments are removed by skids and electric truck, run onto a scale for weighing, and delivered to the yard crane. This scrap is billed to the foreman of the yard who supervises its segregation into bins according to grade.

Cranes play the leading role in handling in most departments of the plant. Practically every building has at least one or more, the melting shop being served by four. These cranes perform all the heavy lifting jobs, loading and unloading the trailers in addition to performing the usual steel mill duties. In the pickling and annealing departments, tramrail cranes and hoists arranged in separate lines do most of the handling.

Approximately 50 extra-large skids are utilized for handling wire to and through storage. A covered area is devoted to this skid storage of wire. The loads are transported by the electric lift truck.

Cranes, both outdoor and indoor, are equipped with a wide variety of tongs, slings and other devices, depending upon the particular nature of the products being handled.

Throughout the entire plant the policy of fitting the materials handling equipment to the job is apparent. Gradually the new specialized units are being co-ordinated with the cranes, tramrails and skids. One of the important tasks in connection with the new trailer system has been to educate workmen to unload the trailers within a reasonable time, but this problem appears to have been solved satisfactorily.

Much of the work of research and selection of types of equipment in connection with the new system was in charge of W. B. Arness, plant metallurgist.

Throats Painted White

■ V & O Press Co., Hudson, N. Y., has recently painted white the throat and in between the housings of its inclinable presses. This was done in the interests of safety and efficiency it is claimed. The press operator now has clearer visibility, thereby reducing eye strain and preventing accidents.

Automotive Engineers Convene in Detroit

(*Concluded from Page* 40)

man and our notoriously variable climate," declared L. W. Child, Evans Products Co., Detroit, at the conclusion of his paper on air conditioning of automobiles and buses for winter and summer. Evans Products, incidentally, is supplying an air conditioning system now available on Hupmobile models. Nash, also, has as optional equipment such an air conditioning unit.

Analyzes Air Conditions

Mr. Child presented a detailed analysis of the problems involved in controlling temperature, humidity, motion and cleanliness of the air in the average automobile. Examining various systems for accomplishing this end, he declared the most logical system appears to be the use of a compressor, operated from the engine through a suitable variable-speed drive. Such a system requires a minimum of space and not over 2 horsepower, a figure well below the power required to operate the present automobile radiator fan, according to the speaker.

The society's annual dinner was held Thursday evening, with F. F. Kishline, Graham-Paige Motors Corp., and chairman of the Detroit section of the S.A.E., acting as toastmaster. C. F. Kettering, vice president in charge of research, General Motors Corp., Detroit, presented one of his usual illuminating and homely discussions centered around the philosophy of research.

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RECENT PUBLICATIONS OF MANUFACTURERS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland

Welding — Lincoln Electric Co., Cleveland, has issued a circular announcing the changeover of a potato peeler stand from cast iron to welded steel. Specifications are given.

Gears—Philadelphia Gear Works, G street, Philadelphia, has issued a 72-page catalog containing illustrations, graphs and engineering data on all types of gears.

Grinders—Safety Grinding Wheel & Machine Co., Springfield, O., has issued a booklet illustrating and describing its vari-speed floor and belt-driven grinders.

Molding Presses—Standard Machinery Co., Mystic, Conn., has issued a 4-page folder illustrating and describing its molding presses and improvements recently made.

Furnaces — Surface Combustion Co., Toledo, O., has released an illustrated bulletin on furnaces for agricultural and road equipment, and embodying engineering data.

Threading Machines — Geometric Tool Co., New Haven, Conn., has published a booklet on its No. 14 threading machine. Specifications, illustrations and engineering data are included.

Meter Units—Bijur Lubricating Corp., Long Island City, New York, has issued a folder describing a small meter unit that keeps correct oil-film in each bearing. Illustrations are included.

Bulkbinding—Signode Steel Strapping Co., 2608 North Western avenue, Chicago, has printed an illustrated booklet describing applications of the tensional steel strapping system for carloading.

Flow Meters—Foxboro Co., Foxboro, Mass., has printed a bulletin containing engineering data and descriptive matter regarding its flow meters for high pressure measurements.

Tool Steels — Milne & Co., 745 Washington street, New York, has released a circular introducing the color bar code for tool steel identification. Engineering data and tables are included.

Die Cushions — Dayton Rogers Mfg. Co., Minneapolis, has issued a folder illustrating and describing various applications of its improved pneumatic die cushion. Engineering data are included.

Coating Materials — Pennsylvania Salt Mfg. Co., 1000 Widener building, Philadelphia, has released a folder describing Pennpaint, a product prepared with a chlorinated rubber base.

Steel Belt Lacing — Bristol Co., Waterbury, Conn., has issued bulletin 728 on steel belt lacing products. Application information regarding various styles and sizes available, and prices are included.

Friction Clutches — Cooper Roller Bearings Co. Ltd., Kings Lynn, Norfolk, Eng., has issued a new 1937 catalog embodying illustrations, specifications and engineering data concerning friction clutches.

Conveyor Belts—Cambridge Wire Cloth Co., 10 Washington street, Cambridge, Md., has released an 8-page bulletin describing and illustrating Monel metal woven wire conveyor belts.

Publications — United States bureau of mines, Washington, has issued a bulletin announcing publications and technical papers which are now available. Orders must be sent to the superintendent of documents.

Wire Products — Firth-Sterling Steel Co., McKeesport, Pa., has published an 8-page pamphlet which contains illustrations and descriptions of wire products ranging from watch spring wire to tool steel drill rods. Engineering data are included.

Coal Mine Equipment — Ingersoll-Rand Co., 11 Broadway, New York, has published bulletin 9047 presenting coal mine equipment. It presents compressors, rock drills, hoists, pumps and pneumatic tools. Tables, engineering data and illustrations are included.

Wire Ropes—Macwhyte Co., Kenosha, Wis., has printed a 16-page booklet showing, with large illustrations, braided wire rope slings used for handling materials. It is entitled, "How To Handle Loads Safely."

Gages and Meters—Hays Corp., Michigan City, Ind., has released 3 publications, No. 37-294, 37-297 and 105, containing illustrations, specifications and engineering data concerning combustion meters, draft gages and excess air.

Shop Equipment—Atlas Press Co., 1819 North Pitcher street, Kalamazoo, Mich., has printed a new catalog No. 28 including illustrations, engineering data and specifications on lathes, drill presses, arbor presses and shapers.

Floodlights — Pyle-National Co., 1334 North Kostner avenue, Chicago, has printed catalog 211 embodying descriptions and engineering data accompanied with illustrations of all types of floodlights and reflectors.

Lathes—Harding Bros. Inc., Elmira, N. Y., has released a bulletin illustrating and describing open cone style precision bench lathes with preloaded ball bearing spindle construction. Specifications are also included.

Improvements — Parker Rust-Proof Co., Detroit, has published bulletin 11 containing illustrations and descriptions featuring the new Nash cars and the part enamel plays in preservation of parts. Included is an announcement of additions to the Parker plant.

Steels — Joseph T. Ryerson & Son Inc., Philadelphia, has published a large 15 x 11 booklet that describes the procedure used in selecting and testing steels. Various steps of the alloy plan are given accompanied with full page illustrations, and data on certified steels.

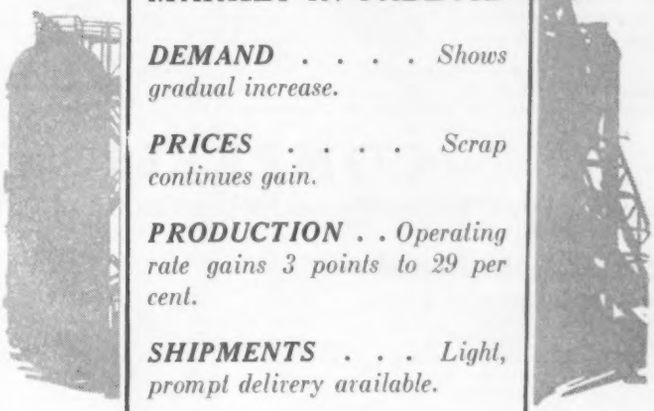
Wire Bindings—Gerrard Co. Inc., 2915 West Forty-seventh street, Chicago, has issued its "Blue Book of Packaging" covering wire strappings and reinforcements from parcel post to carload stowage. Illustrations and specifications are included.

Welding — Lincoln Electric Co., Cleveland, has published a 32-page illustrated booklet entitled, "How to Change Over to Welded Design for Profits" which is intended as an aid in applying electric welding to the design of machines and machinery structures. Included are photographs of production executives engaged in the welding industry.

Nickel Alloys—International Nickel Co. Inc., 67 Wall street, New York, has available three publications entitled, "High Strength Corrosion-Resisting Rivets for Marine Construction," "Nickel Alloy Steels in Oil Well Tools" and "Nickel Alloy Steels for Low Temperature Refinery Service." The first points out features of low carbon nickel steel rivets and the latter two deal with applications of the alloy in oil field equipment, and the strength and creep resistance at elevated temperatures. Engineering data and illustrations are included.

Market Making Slow Advance

Steel Rate Gains; Auto Output Higher; Scrap Rises Again



MARKET IN TABLOID

DEMAND . . . . *Shows gradual increase.*

PRICES . . . . *Scrap continues gain.*

PRODUCTION . . *Operating rate gains 3 points to 29 per cent.*

SHIPMENTS . . . *Light, prompt delivery available.*

■ HESITANCY seems to be the keynote of the steel market, buyers delaying purchases until more definite indications of the future appear.

In the case of railroads it is because of the pending freight rate hearing. Agricultural implement manufacturers seem to be in best position, with production at a good rate. Automotive output shows a slight increase. In some instances it seems steel consumers have fairly large stocks of finished articles and defer further activity until these are moved.

Railroads continue to hold off buying except for urgent requirements. Some cars and locomotives, usually in small lots, are being placed and some foreign business in this line has been booked. Plans to expedite the decision of the interstate commerce commission on the petition for a freight rate increase give hope of releases during March as programs are understood to have been outlined and held back until the financial situation can be judged more accurately. Indicative of this hesitancy is withdrawal of the inquiry of the Western Maryland for 1100 cars on which bids had been taken. It is understood a large eastern road has a program for repair of some 24,000 freight cars which is being withheld until the rate situation is cleared.

Leading in the structural market is some 7000 tons of steel for a dam across the Mississippi river at Clarksville, Mo., on which bids have been asked. The bureau of reclamation has placed 1900 tons of reinforcing bars for work at Calexico, Calif.

Steelmaking shows an upward tendency and last week rose 3 points to 29 per cent. This is the second rise since the low mark of 21 per cent the first week in January. Most centers showed an increase in activity or held to the rate of the preceding week. Chicago gained 2 points to 26.5 per cent, Youngstown 1 to 25, Wheeling 9 to 35, Detroit 19 to 52, New England 7 to 26. Cincinnati resumed at 28 per cent after a week of complete idleness. There was no change in the central eastern seaboard district at 31, Birmingham 63, Buffalo 23 and St. Louis 21. Pittsburgh lost 1 point to 24.5 per cent and Cleveland 2 to 24.

Subsidy agreements made and in the making by the maritime commission provide for construction of 20 to perhaps 64 ships during the next four years. Requirements of steel for this program will be spread over a considerable period but adds to the prospective tonnage mills will be called on to supply. Construction of some of the ships will be undertaken during the present year.

Automobile assemblies last week gained more than 11,000 over the preceding period as Chrysler resumed more normal operations. Total output was 65,735, compared with 54,084 the week before. General Motors produced 22,160, against 22,425; Chrysler built 13,975, compared with 2750; Ford held steady with 22,765 units. Independent builders assembled 6835, compared with 6144 the week before.

Shipments of finished steel by the United States Steel Corp. in December repeated the pattern of other activity indexes, showing a decline from November but an increase of 18 per cent for the entire year, compared with 1936.

Great Britain in December established a record in production of pig iron, making 783,800 tons, the largest tonnage since 1918. A month previously an all-time high was made in production of steel ingots and castings.

For the seventh consecutive week STEEL'S composite of steelworks scrap prices shows an advance, rising 7 cents, to $13.90, on stronger quotations at Pittsburgh. Effect of export demand in the East is believed responsible for some of this strength. Due to advances in scrap prices the iron and steel composite is 4 cents higher, at $38.97. The finished steel composite is unchanged at $61.70.

COMPOSITE MARKET AVERAGES

	Jan. 15	Jan. 8	Jan. 1	One Month Ago Dec., 1937	Three Months Ago Oct., 1937	One Year Ago Jan., 1937	Five Years Ago Jan., 1933
Iron and Steel	$38.97	$38.93	$38.92	$38.88	$39.59	$36.55	$28.17
Finished Steel	61.70	61.70	61.70	61.70	61.70	55.80	46.13
Steelworks Scrap..	13.90	13.83	13.75	13.24	15.93	18.12	6.23

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Jan. 15, 1938	Dec. 1937	Oct. 1937	Jan. 1937
Steel bars, Pittsburgh	2.45c	2.45c	2.45c	2.20c
Steel bars, Chicago	2.50	2.50	2.50	2.25
Steel bars, Philadelphia	2.74	2.75	2.74	2.49
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	2.10
Shapes, Pittsburgh	2.25	2.25	2.25	2.05
Shapes, Philadelphia	2.45½	2.46½	2.45½	2.25½
Shapes, Chicago	2.30	2.30	2.30	2.10
Tank plates, Pittsburgh	2.25	2.25	2.25	2.05
Tank plates, Philadelphia	2.43½	2.44½	2.43½	2.23½
Tank plates, Chicago	2.30	2.30	2.30	2.10
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.40	2.15
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	3.15	2.80
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.80	3.40
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.50	2.25
Sheets, No. 24, hot anneal., Gary	3.25	3.25	3.25	2.90
Sheets, No. 24, galvan., Gary	3.90	3.90	3.90	3.50
Plain wire, Pittsburgh	2.90	2.90	2.90	2.60
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$4.85
Wire nails, Pittsburgh	2.75	2.75	2.75	2.25

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$37.00	$34.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	37.00	34.00
Billets, open-hearth, Pittsburgh	37.00	37.00	37.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	47.00	47.00	47.00	43.00

Pig Iron

	Jan. 15, 1938	Dec. 1937	Oct. 1937	Jan. 1937
Bessemer, del. Pittsburgh	$25.26	$25.26	$25.26	$22.31
Basic, Valley	23.50	23.50	23.50	20.50
Basic, eastern del. East. Pa.	25.26	25.34	25.26	22.26
No. 2 fdy., del. Pittsburgh	25.21	25.21	25.21	22.21
No. 2 fdy., Chicago	24.00	24.00	24.00	21.00
Southern No. 2, Birmingham	20.38	20.38	20.38	17.38
Southern No. 2, del. Cincinnati	23.89	23.89	23.69	20.69
No. 2X eastern, del. Phila.	26.135	26.21½	26.13½	23.13½
Malleable, Valley	24.00	24.00	24.00	21.00
Malleable, Chicago	24.00	24.00	24.00	21.00
Lake Sup., charcoal, del. Chicago	30.24	30.24	30.04	26.54
Gray forge, del. Pittsburgh	24.17	24.17	24.17	21.17
Ferromanganese, del. Pittsburgh	107.49	107.49	107.29	84.79

Scrap

Heavy melting steel, Pittsburgh	$14.25	$13.40	$17.15	$18.95
Heavy melt. steel, No. 2, E. Pa.	14.00	13.13	14.01	16.40
Heavy melting steel, Chicago	13.25	12.50	13.95	18.25
Rails for rolling, Chicago	14.75	14.25	17.25	19.40
Railroad steel specialties, Chicago	15.75	15.75	19.35	19.65

Coke

Connellsville, furnace, ovens	$4.25	$4.37	$4.45	$4.00
Connellsville, foundry, ovens	5.25	5.25	5.25	4.25
Chicago, by-product foundry, del.	11.00	11.00	11.00	10.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Prices Subject to Quantity Extras and deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.74c
Philadelphia, del.	2.70c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pacific ports, f.o.b. dock	2.96c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, delivered	3.49c
Philadelphia, del.	3.45c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pacific ports, f.o.b. dock	3.81c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.10c
New York, delivered	4.14c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pacific ports, f.o.b. dock	4.41c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.10c
Gary	3.20c
Detroit, delivered	3.31c
Philadelphia, del.	3.40c
New York, del.	3.44c
St. Louis, del.	3.33c
Granite City, Ill.	3.30c
Pacific ports, f.o.b. dock	3.71c

Cold Rolled No. 20

Pittsburgh	3.55c
Gary	3.65c
Detroit, delivered	3.76c
Philadelphia, del	3.85c
New York, del.	3.89c
St. Louis	3.78c
Granite City, Ill.	3.75c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher

Tin plate, coke (base box) Pittsburgh	$5.35
Waste-waste, 2.80c; strip	2.50c
Long ternes, No. 24, unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.54c
Philadelphia, del.	2.44½c
Boston, delivered	2.66c
Buffalo, delivered	2.49½c
Chicago or Gary	2.30c
Cleveland, del.	2.45½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific ports, f.o.b. cars, dock	2.81c
St. Louis, delivered	2.52c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.46½c
New York, del.	2.51¼c
Boston, delivered	2.64½c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.46c
Buffalo	2.35c
Gulf Ports	2.66c
Birmingham	2.40c
Pacific ports, f.o.b. cars, dock	2.81c
St. Louis, del.	2.52c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific ports, f.o.b. cars, dock	3.01c
Philadelphia, del.	2.75c
Boston, delivered	2.86c
New York, del.	2.79c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Cleveland	2.35c
Moline, Ill.	2.35c
Buffalo	2.40c
Birmingham	2.45c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.64c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.45c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.50c
Gulf ports	2.85c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.75c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.30c
Chicago, Buffalo, Cleveland, Birm., Young.	2.35c
Gulf ports	2.80c

Wire Products

Prices apply to mixed carloads, base; less carloads subject to quantity extras.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.15c
Galv. fence wire	3.55c
Woven wire fencing (base C. L. column)	.74
Single loop bale ties, (base C. L. column)	.63

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Galvanized wire	2.95c
Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.	
Spring wire, Pitts. or Cleveland	3.50c
Do., Chicago up $1, Worc. $2.	

Cold-Finished Carbon Bars, Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 3.00c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring 0.15
6100 bars 1.20
6100 spring 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c

Strip and Hoops

(Base, hot-rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23/16-in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.61c
Philadelphia, del.	2.70c
New York, del.	2.74c
Cooperage hoop,	
Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.41c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	4.30c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Tie plate, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger, to 1-in.	60-10 off
Do. 1⅛ and 1¼-in.	60-5 off
Tire bolts	50 off

Plow Bolts

All sizes	65-5 off

Stove Bolts

In packages with nuts attached 70 off; in packages with nuts separate 70-10 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.:	
½ to 7/16-inch	60-10 off
Do., 9/16 to 1-inch	60-5 off
Do., over 1-inch	60 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
7/16-inch and smaller, Pitts., Chi., Cleve.	65-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Cut Nails

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts, Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
½	59½	49
¾	62½	53
1—3	64½	55½

Iron

⅜	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Butt Weld

Iron

	Blk.	Galv.
¾	25	7
1 and 1¼	29	13
1½	33	15½
2	32½	15

Lap Weld

1½	23½	7
2	25½	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$23.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2"OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.85	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.94
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.20-58.20
6 to 24-in., Chicago	54.20-55.20
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo, Young., Birm.	$37.00
Philadelphia	42.30
Duluth	39.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleve., No. 5 to 9/32-inch incl.	47.00
Do., over 9/32 to 11/64-inch incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.00- 4.50
Connellsville, fdry.	5.00- 5.50
Connell. prem. fdry	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.50
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.63

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls. to jobbers	7.25c
Per ton, bulk, f.o.b. oven or port	
Sulphate of ammonia	$29.50

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25c; 50c diff. below 1.75 sil. Gross tons.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$25.00	$25.50	$23.50	$26.00
Birdsboro, Pa	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	....	19.38	25.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	....	....	....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00		24.50	
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	....	24.66	....
Boston from Birmingham	26.57	....	26.07	....
Boston from Everett, Mass.	26.30	26.80	25.80	27.30
Boston from Buffalo	26.45	26.95	25.95	27.45
Brooklyn, N. Y., from Bethlehem	27.47	27.97	....	....
Brooklyn, N. Y., from Bmghm.	27.25	....	....	....
Canton, O., fom Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	24.42	....	24.30	....
Cincinnati from Hamilton, O.	24.27	25.11	24.61	....
Cincinnati from Birmingham	23.89	....	22.89	....
Cleveland from Birmingham	24.32	....	23.82	....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.10
Muskegon, Mich., from Chicago, Toledo or Detroit	27.10	27.10	26.60	27.60
Newark, N. J., from Birmingham	26.21	....	....	....
Newark, N. J., from Bethlehem	26.53	27.03	....	....
Philadelphia from Birmingham	25.58	....	25.46	....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	....
Pittsburgh district from Neville Island	∫Neville, base plus 63c, 76c, } and $1.13 switch'g charges			
Saginaw, Mich., from Detroit	26.45	26.45	25.95	25.95
St. Louis, northern	24.55	24.55	24.05	....
St. Louis from Birmingham	†24.12	....	23.82	....
St. Paul from Duluth	26.08	26.08	....	26.58

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phila. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.24
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80
New Jersey	51.00

Ohio

First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	43.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$20.00
Do., for barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.49
Spiegeleisen, 19-21% dom. Palmerton, Pa., spot	33.00
Do., New Orleans	33.00
Do., 26-28%, Palmerton	39.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., ton lot	80.50
Do., 75 per cent	126.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon 111.50; 1%,	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	2.00-2.25
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod-plant, frt. all., net ton	142.50
Contract, ton lots	145.00
Spot, ton lots	150.00
Ferrophosphorus, per ton, c. l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb. f.o.b. mill	0.95
Molybdate, lb. cont. f.o.b. mill	0.80

†Carloads. Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony American Spot, N. Y.	Nickel Cathodes
Jan. 8	10.50	11.12½	10.02½	42.00	42.00	4.85	4.70	5.00	20.00	13.75	35.00
Jan. 10	10.75	11.12½	10.27½	42.00	42.25	4.85	4.70	5.00	20.00	13.75	35.00
Jan. 11	10.87½	11.12½	10.40	42.87½	43.00	4.90	4.75	5.00	20.00	13.75	35.00
Jan. 12	10.87½	11.12½	10.40	43.00	43.25	4.90	4.75	5.00	20.00	13.75	35.00
Jan. 13	10.87½	11.12½	10.40	42.12½	42.37½	4.90	4.75	5.00	20.00	13.75	35.00
Jan. 14	10.87½	11.12½	10.40	41.75	42.00	4.90	4.75	5.00	20.00	13.75	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.00c Conn. copper

Sheets

Yellow brass (high)	17.37½
Copper, hot rolled	19.12½
Lead, cut to jobbers	8.25
Zinc, 100-lb. base	10.00

Tubes

High, yellow brass	20.12½
Seamless copper	19.87½

Rods

High yellow brass	13.37½
Copper, hot rolled	15.62½

Anodes

Copper, untrimmed	16.37½

Wire

Yellow brass (high)	17.62½

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

New York	6.12½-6.37½
Cleveland	6.25-6.50
*Chicago	6.50-6.75
*St. Louis	5.50-5.75

Heavy Copper and Wire

New York, No. 1	7.75-8.00
Cleveland, No. 1	7.75-8.00
*Chicago, No. 1	7.75-8.00
St. Louis	7.62½-7.87½

Composition Brass Borings

New York	5.12½-5.37½

Light Copper

New York	5.75-6.00
Cleveland	5.75-6.00
*Chicago	5.75-6.00
St. Louis	5.50-5.75

Light Brass

*Cleveland	3.75-4.00
*Chicago	4.00-4.25
St. Louis	3.25-3.75

Lead

*New York	3.62½-3.87½
*Cleveland	3.75-3.87½
*Chicago	3.75-4.00
St. Louis	3.25-3.50

Zinc

New York	2.12½-2.25
*Cleveland	2.25-2.50
St. Louis	2.25-2.50

Aluminum

*Borings, Cleveland	7.25-7.50
*Mixed cast, Cleve.	10.25-10.50
*Clips, soft, Cleve.	12.75-13.00
*Mixed cast, St. L.	9.50-9.75

SECONDARY METALS

Brass, ingot, 85-5-5-5, lcl.	11.25
Stand. No. 12 alum.	17.00-17.50

WAREHOUSE IRON AND STEEL PRICES

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore	4.00c
Birmingham	3.85c
Boston††	4.05c
Buffalo	3.90c
Chattanooga	4.21c
Chicago (j)	3.85c
Cincinnati	4.05c
Cleveland	3.75c
Detroit	3.93½c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.96c-4.11c
New Orleans	4.20c
New York‡ (d)	4.12c
Pitts. (h)	3.80c
Philadelphia	4.00c
Portland	4.50c
San Francisco	4.20c
Seattle	4.45c
St. Louis	4.09c
St. Paul	4.10c-4.25c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	4.21c
Baltimore*	3.25c
Cincinnati	4.05c
New York‡ (d)	3.65c
Philadelphia	4.00c
St. Louis	4.09c

REINFORCING BARS

Buffalo	3.10c
Birmingham	3.85c
Chattanooga	4.21c
Cleveland (c)	2.55c
Cincinnati	3.75c
Houston	3.25c
Los Angeles, c.l.	2.975c
New Orleans*	3.24c
Pitts., plain (h)	2.55c
Pitts., twisted squares (h)	3.95c
San Francisco	2.97½c
Seattle	2.975c
St. Louis	3.99c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.90c
Birmingham	3.75c
Boston††	3.92c
Buffalo	3.80c
Chattanooga	4.11c
Chicago	3.75c
Cincinnati	3.95c
Cleveland	3.86c
Detroit	3.95c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	3.97c
Philadelphia	3.90c
Pittsburgh (h)	3.70c
Portland (i)	4.25c
San Francisco	4.05c
Seattle (i)	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

PLATES

Baltimore	3.90c
Birmingham	3.75c
Boston††	3.93c
Buffalo	3.80c
Chattanooga	4.11c
Chicago	3.75c
Cincinnati	3.95c
Cleve., ¼-in., o'r	3.86c
Detroit	3.95c
Detroit, ⅛-in.	4.15c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	4.00c
Philadelphia	3.90c
Phila. floor	5.25c
Pittsburgh (h)	3.70c
Portland	4.25c
San Francisco	4.05c
Seattle	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

NO. 10 BLUE

Baltimore	3.95c
Birmingham	3.80c
Boston (g)	4.00c
Buffalo, 8-10 ga.	3.97c
Chattanooga	4.16c
Chicago	3.85c
Cincinnati	4.00c
Cleveland	3.91c
Det. 8-10 ga.	3.93½c
Houston	3.45c
Los Angeles	4.50c
Milwaukee	3.96c
New Orleans	4.35c
New York‡ (d)	4.07c
Portland	4.25c
Philadelphia	4.00c
Pittsburgh (h)	3.75c
San Francisco	4.30c
Seattle	4.50c
St. Louis	4.39c
St. Paul	4.10c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	4.50c
Birmingham	4.55c
Boston (g)	4.75c
Buffalo	4.80c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.75c
Cleveland	4.66c
Detroit	4.68½c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York‡ (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	5.15c
Seattle	5.35c
San Francisco	5.15c
St. Louis	4.84c
St. Paul	4.75c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	4.70c
Birmingham	5.20c
Buffalo	5.45c
Boston (g)	4.85c
Chattanooga*	4.66c
Chicago (h)	5.10c-5.75c
Cincinnati	5.40c
Cleveland	5.31c
Detroit	5.40c
Houston	4.50c
Los Angeles	5.75c
Milwaukee	5.21c-5.86c
New Orleans*	5.75c
N. Y. ov. 10 bd.	5.00c
Philadelphia	5.30c
Pitts.** (h)	5.40c
Portland	5.90c
San Francisco	5.85c
Seattle	5.90c
St. Louis	5.49c
St. Paul	5.40c
Tulsa	5.20c

BANDS

Baltimore	4.20c
Birmingham	4.05c
Boston††	4.25c
Buffalo	4.22c
Chattanooga	4.41c
Cincinnati	4.25c
Cleveland	4.16c
Chicago	4.10c
Detroit, ⅛ & Und.	4.185c
Houston	3.35c
Los Angeles	4.80c
Milwaukee	4.21c
New Orleans	4.75c
New York‡ (d)	4.32c
Philadelphia	4.10c
Pittsburgh (h)	4.00c
Portland	5.00c
San Francisco	4.80c
Seattle	4.95c
St. Louis	4.34c
St. Paul	4.35c

HOOPS

Baltimore	4.45c
Boston††	5.25c
Buffalo	4.22c
Chicago	4.10c
Cincinnati	4.25c
Detroit, 14 & Und.	4.185c
Los Angeles	6.55c
Milwaukee	4.21c
New York‡ (d)	4.32c
Philadelphia	4.35c
Pittsburgh (h)	4.50c
Portland	6.50c
San Francisco	6.50c
Seattle	6.30c
St. Louis	4.34c
St. Paul	4.35c

COLD FIN. STEEL

Baltimore (c)	4.50c
Birmingham	4.91c
Boston*	4.65c
Buffalo (h)	4.35c
Chattanooga*	4.86c
Chicago (h)	4.30c
Cincinnati	4.50c
Cleveland (h)	4.30c
Detroit	4.30c
Los Ang. (f) (d)	6.85c
Milwaukee	4.41c
New Orleans	5.10c
New York‡ (d)	4.57c
Philadelphia	4.53c
Pittsburgh	4.15c
Portland (f) (d)	7.10c
San Fran. (f) (d)	6.80c
Seattle (f) (d)	7.10c
St. Louis	4.54c
St. Paul	4.77c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.845c
Buffalo	3.79c
Chicago	3.87c
Cincinnati	3.82c
Cleveland (b)	3.60c
Detroit	3.43c
New York‡ (d)	3.92c
St. Louis	4.54c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)

	Base
High speed	82c
High carbon, Cr.	45c
Oil hardening	26c
Special tool	24c
Extra tool	20c
Regular tool	16c
Water hardening	12½c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)	Discount
Birmingham	50-10
Chicago (a)	55 to 60
Cleveland	60-5-5
Detroit	70-10
Milwaukee	60 to 65
New Orleans	60
Pittsburgh	65-5

(a) Under 100 lbs., 50 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 0.15c higher.

On plates, shapes, bars, hot strip and blue annealed quantity extras and discounts as follows: Under 100 lbs., add $1.50; 100 to 399 lbs., add 50c; 400 to 3999 lbs., base; 4000 to 9999 lbs., deduct 10c; over 10,000 lbs., deduct 15c. At Cleveland, under 400 lbs., add 50c, with $1 minimum invoice.

‡Domestic steel; *Plus quantity extras; **One to 9 bundles; *† 50 or more bundles; †New extras apply; ††Base 10,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Jan. 13

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$30.00 6 0 0	$19.50	2 9 0
Basic bessemer	....	20.80	2 12 0
Hematite, Phos. .03-.05	36.25 7 5 0*	.....	.....
SEMIFINISHED STEEL			
Billets	$39.38 7 17 6	$43.01	5 7 6
Wire rods, No. 5 gage	56.38 11 5 6	48.00	6 0 0
FINISHED STEEL			
Standard rails	$50.63 10 2 6	$46.00	5 15 0
Merchant bars	2.73c 12 5 0	1.99c to 2.17c	5 10 0 to 6 0 0
Structural shapes	2.37c 10 12 6	1.94c	5 7 6
Plates, †¼ in. or 5 mm.	2.58c 11 11 3	2.59c	7 2 6
Sheets, black, 24 gage or 0.5 mm.	3.34c 15 0 0	2.63c to 3.18c	7 5 0 to 8 15 0††
Sheets, gal., 24 gage, corr.	3.96c 17 15 0	3.62c to 3.89c	10 0 0 to 10 15 0
Bands and strips	3.07c 13 15 0	2.09c to 2.17c	5 15 0 to 6 0 0
Plair wire, base	4.35c 19 10 0	2.42c	6 17 6
Galvanized wire, base	5.18c 23 5 0	3.18c	8 15 0
Wire nails, base	4.13c 18 10 0	2.90c	8 0 0
Tin plate, box 108 lbs.	$ 5.63 1 2 6	.....	.....

British ferromanganese $102.50 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

		£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$27.25	5 9 0	(a) $18.17	554	$24.67	730	$25.38	63
Basic bessemer pig iron	25.00	5 0 0	(a)	.....	.....	.....	28.00 (b)	69.50
Furnace coke	9.38	1 17 6	6.20	189	7.27	215	7.65	19
Billets	39.38	7 17 6	27.55	840	32.45	950	38.88	96.50
Standard rails	2.26c	10 2 6	1.73c	1,150	2.05c	1,375	2.38c	132
Merchant bars	2.55c	11 9 0	1.62c	1,080	1.65c	1,100	1.98c	110
Structural shapes	2.46c	11 0 6	1.58c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.61c	11 14 3	2.03c	1,350	2.05c	1,375	2.29c	127
Sheets, black	3.51c	15 15 0§	2.35c	1,565‡	2.35c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	4.13c	18 10 0	3.30c	2,200	4.50c	3,000	6.66c	370
Plain wire	4.35c	19 10 0	2.49c	1,660	2.48c	1,650	3.11c	173
Bands and strips	2.72c	12 4 0	1.82c	1,210	2.32c	1,550	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. del. Middlesbrough. b hematite. ††Close annealed.
**Gold pound sterling carries a premium of 64.41 per cent over paper sterling.

—The Market Week—

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	10.00
Birmingham, No. 2.	9.00
Bos. dock No. 1 exp.	14.00
N. Eng. del. No. 1..	13.50
Buffalo, No. 1	13.00-13.50
Buffalo, No. 2	11.00-11.50
Chicago, No. 1	13.00-13.50
Cleveland, No. 1 ..	12.50-13.00
Cleveland, No. 2 ...	11.50-12.00
Detroit, No. 1	9.50-10.00
Eastern Pa., No. 1..	15.00
Eastern Pa., No. 2..	14.00
Federal, Ill.	11.50-12.00
Granite City, R. R..	12.75-13.25
Granite City, No. 2.	11.50-12.00
† Los Angeles, No. 1	8.00- 8.50
New York, No. 1....	†11.00
N. Y. dock No. 1 exp.	13.50
Pitts., No. 1 (R. R.)	15.50-16.00
Pitts., No. 1 (dlr.)..	14.00-14.50
Pittsburgh, No. 2...	12.00-12.50
St. Louis, R. R.....	12.75-13.25
St. Louis, No. 2....	11.50-12.00
San Francisco, No. 1	14.00-15.00
Seattle, No. 1	8.00
Toronto, dirs. No. 1	10.00
Toronto, No. 2	9.00
Valleys, No. 1	13.50-14.00

COMPRESSED SHEETS

Buffalo, dealers....	11.00-11.50
Chicago, factory ..	11.50-12.00
Chicago, dealer	10.50-11.00
Cleveland	12.00-12.50
Detroit	10.25-10.75
E. Pa., new mat. ..	15.00
E. Pa., old mat.	10.50-11.00
Pittsburgh	14.00-14.50
St. Louis	7.25- 7.75
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	10.00-10.50
Cincinnati, del.	9.50-10.00
Cleveland	9.00- 9.50
Pittsburgh	13.00-13.50
St. Louis	6.75- 7.00
Toronto, dealers ...	7.00

SHEET CLIPPINGS, LOOSE

Chicago	7.00- 7.50
Cincinnati	6.00- 6.50
Detroit	7.00- 7.50
† Los Angeles	4.00
St. Louis	5.50- 6.00

STEEL RAILS, SHORT

Birmingham	15.00
Buffalo	18.00-18.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, del.	17.00-17.50
Detroit	14.50-15.00
Pitts, 3 ft. and less	18.25-18.75
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†11.00
Buffalo	15.50-16.00
Chicago	13.00-13.50
Cleveland	16.50-17.00
Pittsburgh	15.75-16.25
St. Louis	13.50-14.00
Seattle	10.00

STOVE PLATE

Birmingham	8.00- 8.50
Boston, district	†8.25- 8.50
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers..	5.50- 6.00
Detroit, net	8.50- 9.00
Eastern Pa.	13.00-13.50
New York, fdry. ...	†8.50- 9.00
St. Louis	9.00- 9.50
Toronto, deal'rs, net	9.00

SPRINGS

Buffalo	17.50-18.00
Chicago, coil	17.00-17.50
Chicago, leaf	15.50-16.00
Eastern Pa.	18.00-18.50
Pittsburgh	18.25-18.75
St. Louis	15.25-15.75

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	12.50-13.00

RAILROAD SPECIALTIES

Chicago	15.50-16.00

LOW PHOSPHORUS

Buffalo, crops	17.50-18.00
Cleveland, crops ...	19.50-20.50
Eastern Pa., crops..	19.00-19.50
Pittsburgh, crops...	18.25-19.25

FROGS, SWITCHES

Chicago	13.00-13.50
St. Louis, cut	13.50-14.00

SHOVELING STEEL

Federal, Ill.	11.00-11.50
Granite City, Ill. ..	11.00-11.50
Toronto, dealers....	8.00

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.00- 9.50
Chicago, No. 1 net..	10.00-10.50
Cincinnati, No. 2...	9.50-10.00
Eastern Pa., No. 1..	15.50-16.00
St. Louis, No. 1 ...	9.00- 9.50
St. Louis, No. 2....	13.00-13.50
Toronto, No. 1 dlr..	16.00

SPECIFICATION PIPE

Eastern Pa.	14.00-14.50
New York	†9.00- 9.50

BUSHELING

Buffalo, No. 1	11.00-11.50
Chicago, No. 1	11.50-12.00
Cincin., No. 1, deal..	8.50- 9.00
Cincinnati, No. 2...	3.00- 3.50
Cleveland, No. 2 ..	8.50- 9.00
Detroit, No. 1, new.	9.50-10.00
Valleys, new, No. 1	12.50-13.00
Toronto, dealers....	7.00

MACHINE TURNINGS

Birmingham	6.00- 7.00
Buffalo	7.00- 7.50
Chicago	6.50- 7.00
Cincinnati, dealers..	4.00- 4.50
Cleveland	7.50- 8.00
Detroit	5.25- 5.75
Eastern Pa.	8.50- 9.00
New York	†5.00- 5.50
Pittsburgh	8.00- 8.50
St. Louis	5.00- 5.50
Toronto, dealers....	7.00
Valleys	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†2.50
Buffalo	7.00- 7.50
Cincinnati, dealers..	3.50- 4.00
Cleveland	9.00- 9.50
Detroit	6.25- 6.75
Eastern Pa.	8.00- 8.50
New York	†4.50- 5.00
Pittsburgh	7.00- 7.50
Toronto, dealers....	7.50

CAST IRON BORINGS

Birmingham	6.00- 7.00
Boston dist. chem...	†7.50- 8.00
Bos. dist. for mills	†7.00- 7.50
Buffalo	7.00- 7.50
Chicago	6.50- 7.00
Cincinnati, dealers..	3.50- 4.00
Cleveland	9.00- 9.50
Detroit	6.25- 6.75
E. Pa., chemical....	13.50-14.00
New York	†4.50- 5.00
St. Louis	5.00- 5.50
Toronto, dealers....	7.50

PIPE AND FLUES

Cincinnati, dealers..	7.00- 7.50
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	9.50-10.00
Chicago, net	8.50- 9.00
Cincinnati	5.50- 6.00
Eastern Pa.	13.00-13.50
New York	†8.50- 9.00
St. Louis	9.00- 9.50

FORGE FLASHINGS

Boston district	†6.50
Buffalo	11.00-11.50
Cleveland	11.00- 11.50
Detroit	9.00- 9.50
Pittsburgh	12.50-13.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.50-16.00

ARCH BARS, TRANSOMS

St. Louis	15.50-16.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	12.00-12.50
Chicago, elec. fur...	11.50-12.00
Eastern Pa.	13.50-14.00
St. Louis	9.50-10.00
Toronto	8.00

STEEL CAR AXLES

Birmingham	16.00-17.00
Buffalo	17.00-17.50
Boston district	†14.00
Chicago, net	17.50-18.00
Eastern Pa.	21.50-22.00
St. Louis	18.50-19.00

SHAFTING

Boston district	†15.00
New York	†15.50-16.00
Eastern Pa.	19.00-19.50
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	14.00-15.00
Boston dist., iron...	†10.00
Buffalo, steel	17.00-17.50
Chicago, iron	15.00-15.50
Chicago rolled steel	15.00-15.50
Cincinnati, iron	15.00-15.50
Eastern Pa., iron..	16.50-17.00
Eastern Pa., steel..	18.00-18.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel...	18.25-18.75
St. Louis, iron	14.00-14.50
St. Louis, steel	15.50-16.00

NO. 1 CAST SCRAP

Birmingham	14.00-14.50
Boston, No. 1 mach.	†11.00
N. Eng. del. No. 2..	12.00
N. Eng. del. textile.	15.50-16.00
Buffalo, cupola ...	14.00-14.50
Buffalo, mach.	15.50-16.00
Chicago, agri. net..	10.50-11.00
Chicago, auto	11.50-12.00
Chicago, railr'd net	10.50-11.00
Chicago, mach. net.	12.50-13.00
Cincin., mach. cup...	10.50-11.00
Cleveland, mach....	17.00-17.50
Eastern Pa., cupola.	16.00-16.50
E. Pa., mixed yard..	14.00-14.50
Pittsburgh cupola..	16.00-16.50
San Francisco, del..	13.50-14.00
Seattle	8.00
St. Louis, No. 1 ...	12.00-12.50
St. L., No. 1, mach.	12.50-13.00
Toronto, No. 1, mach., net	12.50

HEAVY CAST

Boston dist. break..	†9.25
N. Eng., del.	12.50-13.00
Buffalo, break	11.50-12.00
Cleveland, break....	14.50-15.50
Detroit, break.	10.00-10.50
Detroit, auto net...	12.50-13.00
Eastern Pa.	14.00-14.50
New York, break. ..	†10.50-11.00
Pittsburgh	12.50-13.00

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del...	16.00
Buffalo	14.00-14.50
Chicago, R. R.	14.50-15.00
Cincin., agri. del...	10.50-11.00
Cleveland, rail	15.50-16.00
Detroit, auto	11.50-12.00
Eastern Pa., R. R. ..	16.50-17.50
Pittsburgh, rail	13.75-14.25
St. Louis, R. R.	14.00-14.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-17.00
Boston	†12.00
Chicago	14.50-15.00
Eastern Pa.	18.00-18.50
New York	†15.00-15.50
St. Louis	14.00-14.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	14.75-15.25

LOW PHOS. PUNCHINGS

Buffalo	17.00-17.50
Chicago	15.00-15.50
Eastern Pa.	19.00-20.00
Pittsburgh (heavy).	18.00-18.50
Pittsburgh (light)..	17.50-18.00
Seattle	15.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	nominal
Swedish low phos...	17.00-18.00
Spanish No. Africa basic, 50 to 60% nom..	12.00
Tungsten, sh. ton. unit, duty paid nom.	24.50-25.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f..	$25.50-26.50

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% .. .. non.	45.00
So. African, 50-52% ..... non.	45.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 66

Pittsburgh—Encouraging trends indicated last week are being felt to an increasing degree. Although inventories of automobile manufacturers and partsmakers have not yet been depleted to a point where any heavy buying is expected immediately, there has been considerable activity which has raised production figures above last week's low. Most heartening is the jump in galvanized sheet production, up 14 points from last week's bottom of 20 per cent.

Specialties and agricultural implements seem to have pointed the way for the rise. Small items from manufacturers whose inventories have been depleted account for some increase. General sheet mill operations reflected the rise, jumping up 6 per cent to 25 per cent of capacity against last week's low of 19 for common black.

Cleveland — While finishing mill operations have increased somewhat since the first of the year, it is due primarily to accumulation of orders booked late in December for January delivery. Current specifications are light and in some instances below the comparable period in December. Jobbers continue to come into the market for fill-in purposes only, as stocks are still large on certain grades. No change in prices has been reported.

Chicago—Sheet buying continues slow and improvement in buying has been small. Automotive needs are spotty, showing a moderate improvement among some interests. Miscellaneous sheet demand shows little change but the small inventories of many consumers will necessitate additional buying upon the appearance of any upturn in consumption.

Boston—While there has been no sustained improvement in sheet buying, a spotty gain in the number of small orders for prompt delivery from jobbers and miscellaneous consumers is noted. Some tack plate tonnage has been placed for delivery over the present quarter, but stamping, forming and manufacturing buying is light as a rule, users covering for immediate needs only. Such requirements are small. That galvanized stocks are low is indicated by more small orders for prompt shipment.

New York—While still considerably restricted, sheet demand is providing for some degree of optimism. One leading seller has recently experienced the best week since last October, and some improvement has been noted by other mill representatives here. Most of the improvement is in jobber demand. Open weather experienced here until recently has reduced jobbers' stocks at a faster rate than originally anticipated and now, with inventory season past, replacement tonnages have been more numerous and individually larger. Of the direct consumers, refrigerator manufacturers appear to be the most active. Their releases are not up to the volume of a year ago, however.

Philadelphia — Improvement in sheet specifications is coming principally from jobbers. Little gain in direct purchases by consumers is noted, sellers declare. This is attributed in part to the fact that a number of consumers have substantial stocks of finished products on hand and consequently are none too interested in replacing raw material stocks. Moreover, autobody makers here are still holding up releases to a considerable degree pending word from automobile builders. Radio manufacturers are buying practically nothing. Bids were opened late last week on approximately 150 tons

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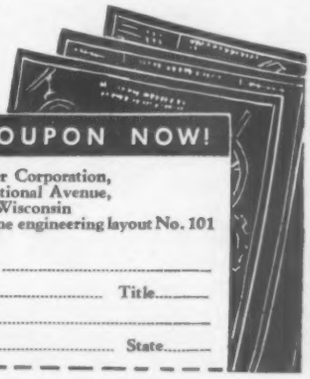

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Cincinnati — Sheet market shows no appreciable upturn although buying is more active for fill-in requirements as consumer inventories shrink. Miscellaneous purchases for immediate needs are light but cover a broad range. Export shipments are maintained better than domestic business.

St. Louis — The sheet situation continues quiet, though both sales and inquiries show noticeable betterment, contrasted with the two closing weeks of 1937. Consumer stocks of enameling sheets are reported in considerable volume in a number of instances.

Birmingham, Ala.—Mills report continued slight improvement in demand for sheets following a recent lull. Sheets continue as the most steady operations in the district.

Strip

Strip Prices, Page 67

Pittsburgh—Strip mills have come in for their share of new activity. Hot mills showed a rise of 7 points to 21 per cent last week, and cold strip rolling mills 5 points to 22 per cent.

Cleveland — Specifications for both wide and narrow strip are small as the operating schedules of most consumers have shown practically no improvement. There has been little incentive to buy for other than fill-in purposes. Auto partsmakers, electrical equipment and small tool manufacturers are not expected to do any substantial buying until their own bank of inventory is greatly reduced. However, producers report orders from customers that have not been in the market for over three months, indicating that in some instances renewed buying has become necessary.

Chicago—Occasional small gains are recorded in strip buying but improvement in consumption so far this month has been only moderate and operations of producers are restricted. Automotive needs are irregular, being heavier in some directions, though change in total buying is slight.

Birmingham, Ala.—Demand for strip is light. Few orders for cotton ties are coming in.

Boston—Slight gain in the number of narrow cold strip orders has not been sufficient to materially change rerolling operations. There is little evidence that consumption has increased, the mild improvement in buying being due to depleted stocks of some specifications with demand in line with curtailed fabricator operations.

New York — Cold strip buying continues sluggish. Demand is confined mostly to fill-in requirements for prompt delivery with little purchasing for future needs. Strip consumption is below normal with the bulk of industrial users affected. Hot strip specifications are slack. Prices are steady.

Philadelphia—Some replacement buying of narrow strip is being done by jobbers, but generally speaking demand has shown little improvement. Prices are nominally unchanged at 2.70c, Philadelphia, for hot strip and 3.50c for cold.

Plates

Plate Prices, Page 66

New York—That 14 merchant ships out of a total of at least 20 would be placed under construction this year as a result of subsidy pacts just announced last week by the United States maritime commission has further enhanced the outlook for plate makers. Moreover, the Union Oil Co. of California has just announced that it will take bids early in February for a tanker of 13,000 tons deadweight, with delivery to be made within a year.

The 20 ships will be for the account of seven steamship lines, which also have plans under way for 23 additional ships. While it has not been divulged officially as to how many are being considered by each of the seven companies, it is known that Lykes Brothers-Ripley Steamship Inc. at the close of last year had 28 under contemplation for construction over a course of five years. The New York and Cuba Mail Steamship Co., another to have formed a long-term subsidy agreement, had one passenger-cargo ship proposed.

Another, the South Atlantic Steamship Co. had five vessels, and the Mississippi Shipping Co., three passenger-cargo ships. The Oceanic Steamship Co. had two passenger-cargo ships, and the United States Lines Inc., eight cargo ships, in addition to the large liner awarded last Fall to the Newport News Shipbuilding & Dry Dock Co., Newport News, Va. In addition to these six companies, the Grace Steamship Co. has signed a subsidy agreement, but the extent of its proposed construction has not been indicated.

Meanwhile, shipbuilders are figuring actively on the 12 cargo ships on which the maritime commission is opening bids Feb. 1. Steel inquiries for the 12 Standard Oil tankers, recently awarded, will probably not be out for another 30 days, it is believed in some quarters. Miscellaneous plate demand is still sluggish.

Philadelphia—Following the recent distribution of steel for the two large navy tenders by the New York Shipbuilding Corp., Camden, N. J., to Republic Steel Corp., Cleveland, and Bethlehem Steel Co., Bethlehem, Pa., platemakers have been in receipt of little ship tonnage. Considerable ship work is in prospect, but it is believed that little new tonnage will come out, at least from private yards, for another month or so. This is said to be the prospect particularly with respect to the 12 tankers noted in a previous issue as placed by the Standard Oil Co. of New Jersey, with a district yard, the Sun Shipbuilding & Dry Dock Co., Chester, Pa., participating with an order for three tankers. These 12 tankers, it is now revealed, will be constructed over a period of three years with the first four tankers to be delivered in the spring and early summer of 1939, one each by each of the four yards participating in the construction.

Hence, there is no immediate pressure for steel; furthermore, certain of these shipyards are figuring on the 12 cargo boats on which bids are to be opened by the United States maritime commission Feb. 1 and it appears likely that they may await the results of this opening before placing steel for the Standard tankers.

Prospects of early car work were given a set-back last week when Western Maryland rejected all bids on 1100 miscellaneous freight cars. A large car repair program for the Pennsylvania awaits the rate decision of the Interstate Commerce commission and a general pick up in traffic — approximately 24,000 cars.

Boston—Carlot orders for plates are slightly more numerous, generally traceable to stock coverage, although such buying is by no means impressive. For miscellaneous needs, including boiler shops, there have been a few more small orders for limited lots. As a rule, however, specifications are for urgently needed material without much inquiry for future needs. Bids are in on 200 tons for a standpipe, Scituate, Mass., but tank tonnage is generally small.

Cleveland—Outside of Chesapeake & Ohio railroad's inquiry for 25 covered hopper cars of 70-ton capacity little tonnage is pending from railroads. However, ship repair work is expected to require considerable

tonnage over the next few months. Miscellaneous needs for floor plates and other small tonnage requirements continue at much the same volume as during December. Prices are unchanged.

Chicago—Prospects for improved business in plates depend largely on how soon equipment buying is resumed by railroads. The Burlington has started work on 1250 freight cars, but most railroad shops are operating on light schedules. Tank inquiries total 1150 tons. A 175-mile pipe line is planned in Texas by the Texas-New Mexico Pipe Line Co. A substantial tonnage of plates will be required for a Mississippi river dam at Clarksville, Mo.

Birmingham, Ala.—Some improvement in bookings of plates is reported but mostly in small and scattered lots. Additional business in this specification is believed to be in sight.

Seattle—Washington state has awarded 270 tons to the Columbia Steel Co. for 1939 automobile license plates. Seattle's proposed steel pipe water extension, about 2800 tons, has been postponed pending sale of a $500,000 bond issue.

Plate Contracts Placed

680 tons, two 85,000-barrel tanks, Goodhope, La., for Steel Tank Construction Co., to Graver Tank & Mfg. Co. Inc., East Chicago, Ind.

270 tons, Washington state 1939 automobile license plates, to Columbia Steel Co., Seattle.

167 tons, circular 268, United States engineer, Kansas City, Mo., to Central Iron & Steel Co., Harrisburg, Pa.; bids Dec. 23, awarded Jan. 10.

160 tons, 200,000-gallon tank and tower, Milford, Del., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Unstated tonnage, two 50-inch i. d. welded plate steel outlet pipe, Boca dam, California, specification 1003-D, to Columbian Steel Tank Co., Kansas City, Mo., $8125, f.o.b. Boca; bids Jan. 4.

Plate Contracts Pending

2800 tons, Seattle Volunteer park—Magnolia extension; project postponed.

750 tons, tanks, Smith Bluff, Texas.

400 tons, tank, Detroit.

Unstated tonnage, oil barge, 40,000 gallons or more capacity; bids Jan. 21, United States engineer, Jacksonville, Fla.

Bars

Bar Prices, Page 66

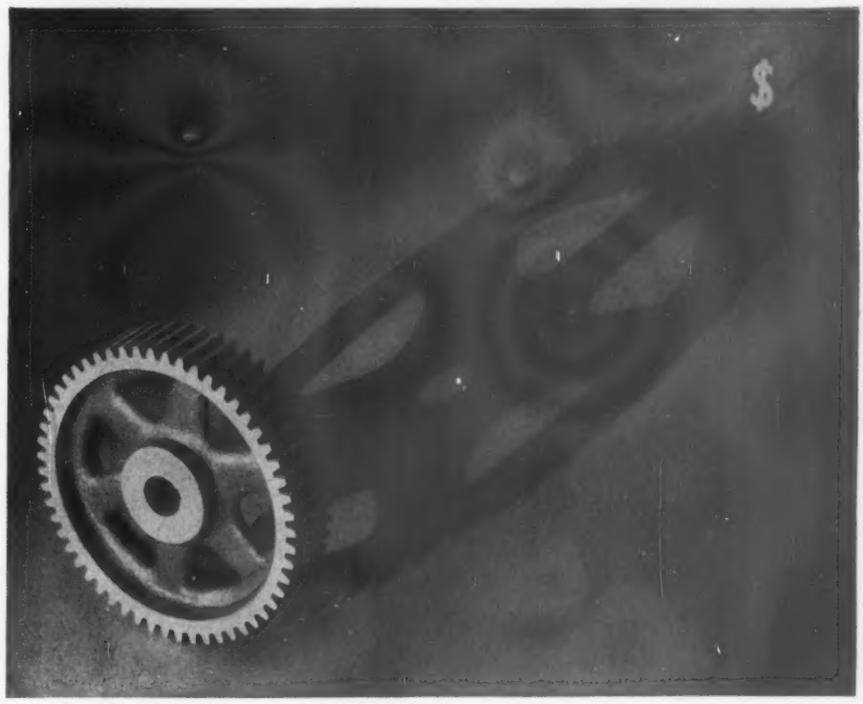
Pittsburgh—Small lot buying continues the only factor in the bar market. Producers hope, however, the recent back-to-work call by some automotive producers will presage tonnage orders. Prices are firm.

Cleveland — Consumers of carbon and alloy steel bars continue on restricted operating schedules and are consequently specifying on a hand-to-mouth basis. Most producers confidently feel that once customers' stocks show a definite trend to move at an accelerated rate, increased volume of specifications is bound to appear. Mill prices are firm.

New York—A slight lift is noted in commercial bar demand, but a spotty situation still prevails. Principal business appears to be coming from warehouses for fill-in requirements. Much the same situation prevails in cold-finished bars, although in this case some fairly substantial buying is seen as coming indirectly from machinery manufacturers.

Boston—After a mild but spotty flurry in commercial steel bar buying, demand has declined. Jobbers were responsible for the temporary improvement. Alloy buying in small lots is steady. There is a slight upturn in forging bar stock as shops in one or two instances are somewhat more active. Railroads are taking practically nothing.

Chicago—Steel bar demand is moderately heavier. Consumption has advanced above the level of late December, but recovery has



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Behind the Scenes with STEEL

Household Hint Dept.

■ Several times during the past week we've been flattered to have the wife ask us to bring home another copy of STEEL's Yearbook of Industry issue. We had visions of her passing out copies to friends and saying, in effect, "Lookit the swell seed catalog the old man works on!" But after lugging home the third copy, we began to get suspicious. You guessed it—that clever Norton Abrasive ad, with its sandpaper wheels, is ideal for filing feminine fingernails. Incidentally you may have wondered how this sandpaper effect was printed. As near as we can discover, some kind of goo is printed on the wheels and the silica sand "blown on by hand," as one of the boys put it.

Smoking in the Loges

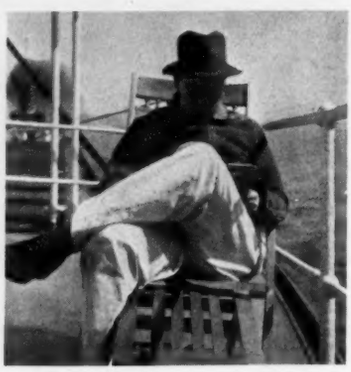
■ Anent this corner's recent comment on the venerable "yours truly" signature, comes a communique from Kramer Bros. Foundry Co. in Dayton, quote: Mr. Shrdlu, Dear Sir: Answering yours of the December 20th issue, let me say: Instead of closing your letters with 'I remain yours truly' you could say 'I am STEEL yours truly.' If you do, I will not say you are STEELing my stuff. Ironically yours, G. Edward Loges, unquote. Well, we sure let ourselves in for some pun-ishment that time, but thanks for the suggestion, G., and if we had more brass we'd be lead to ask the Skipper to let us use that closing. Drop in sometime and we'll take you for a ride on our ferrous wheel.

STEEL Goes to Sea

■ We have before us this day a sheaf of letters complimenting STEEL on the Yearbook of Industry issue (we swear we won't mention it again). On behalf of the editors we have blushed with a decent amount of modesty at all the nice things that were said about the Big Thing, but one letter in particular struck a sentimental note in our heart. It seems the head of a large engineering company was sailing for England the first of the year, and the general manager, down to see him off, presented him not with the usual bon voyage but with a copy of Our Big Job. A nice anticlimax is that the going-away-er thought the issue the finest he had ever seen and, as the ship listed heavily to starboard, directed that a copy be sent their London office immediately. The Readers Service department has yet to confirm a rumor that, in case similar occasions arise, copies of STEEL can be furnished wrapped in cellophane, tied with red ribbon and including three bottles of champagne and a basket of fruit and candy.

Space-Shagger's Siesta

■ With a revival of our Morbid Camera Dept., we present this strictly behind-the-scenes shot of



STEEL's Central-Western manager, Russ Jaenke. Russ and his wife were lucky enough to be on the receiving end of one of those freighter trips up to Superior last summer. Just before this unretouched photo was taken, the captain stopped by to ask Russ was he taking a sunbath. Mrs. J. said no, it was just so hot in the house that they came out on the porch to cool off. But whether they speak nautical language or not, one of these trips is "nice going, if you can get it," according to the Jaenkes.

—SHRDLU

been small. Farm equipment manufacturers make the best showing, with automotive demand still light despite occasional improvement in specifications.

Philadelphia—Continued light volume of orders makes rolling schedules irregular. Deliveries are not offered with the promptness of a month ago. As a result jobbers are participating in a greater percentage of going business. There is, however, a slight increase in mill bookings, an improvement attributed more to releases from jobbers than from consumers. Prices are steady at 2.75c, delivered Philadelphia.

Pennsylvania public utility commission has approved a 10 per cent increase on intrastate freight rates on about 140 commodities. On other increases to which objection has been made hearings will be held.

Birmingham, Ala.—Reports of an increase in operations of the farm implement industry bring reassurance to prospects for demand for bars in the South. Some increase, as a result of scattered orders, already is noted.

Pipe

Pipe Prices, Page 67

Pittsburgh — Pipe and tubular goods producers expect a continuation of business at present levels. In contrast to December, which started off in high gear and slumped off at the close, January will, from present indications, hold steady at a somewhat slower pace. Active markets are not looked for until proposed projects are confirmed late this quarter or early in the second quarter.

Of the oil line pipe for Colombia, South America, recently placed by the Texas Co. the portion awarded Jones & Laughlin Steel Corp., Pittsburgh, will be seamless pipe, instead of electric welded pipe. About half the total tonnage will be electric welded.

Cleveland — Pipe distributors note little improvement in current demand either for industrial repairs and extensions or from domestic sources. Mill prices on all grades of steel pipe are firm, although jobbers have recently announced a reduction of 15 per cent on steel pipe fittings out of stock. Cast iron pipe foundries continue on reduced schedules. Few projects are pending and inquiries are slow to appear.

Chicago—Lake, Wis., has placed 6000 tons of various sizes of cast pipe, the largest individual order awarded in this district in many months. New inquiries are light but Chicago is taking bids on 1918 tons

of 8 and 12-inch material. Cast pipe producers anticipate a quiet market during the balance of this quarter. Prospects for line pipe business have been aided by the announcement of plans for the laying of 175 miles of 8-inch pipe in western Texas.

Boston—Cast pipe buying is more active as some municipalities are quietly covering on partial annual needs. Tonnage for specified work approximates 800 tons. District foundry continues to operate five days a week, well above the general industrial average. Merchant steel pipe demand is steady, but not large; wrought pipe is sluggish.

Birmingham, Ala.—Cast iron pipe demand, while spotty, holds up sufficiently to maintain 40 per cent or slightly better operations, and with one of the large plants on a four-day week, somewhat above the average. Some new inquiries are reported.

San Francisco—With one exception cast iron pipe inquiries are confined to lots of less than 100 tons and total pending business is limited to about 1100 tons. Largest inquiry calls for 918 tons of 4 to 12-inch pipe for the La Mesa, Lemon Grove & Spring Valley Irrigation district, La Mesa, Calif., up for bids Jan. 18. Awards for the first week aggregated 215 tons, compared with 110 tons for the same period a year ago.

Seattle — Spokane, Wash., has awarded R. D. Wood & Co., Philadelphia, 175 tons of 6 and 12-inch cast iron pipe, previously reported to an unstated interest. Low bid for the Silver Lake district, Washington, water system involving considerable steel pipe, was offered by Macri Bros., Seattle, at $53,320. Whatcom county, Washington, opened bids at Bellingham Jan. 11 for a water and fire protection system. Lowell water district, Everett, Wash., plans an $87,000 distributing and fire protection system. Hardesty Mfg. Co., Salt Lake City, Utah, has been awarded an unstated tonnage of pipe and equipment for a water system at Preston, Ida.

Cast Pipe Placed

6000 tons, various sizes, Lake, Wis., to United States Pipe & Foundry Co., Burlington, N. J.

310 tons, 16-inch, Everett, Mass., to Warren Foundry & Pipe Co., Everett, Mass.

300 tons, 10-inch and under, North Haverhill, N. H., to United States Pipe & Foundry Co., Burlington, N. J.; Anthony Ross & Son, Lexington, Mass., general contractor. Northern Steel Co., Boston, awarded small tonnage reinforcing bars for same water project.

250 tons, 6 to 12-inch, Augusta, Me., to R. D. Wood & Co., Florence, N. J.

Unstated, pipe and fittings for Preston, Idaho, water system, to Hardesty Mfg. Co., Salt Lake City, Utah.

Steel Pipe Pending

Unstated tonnage, 175 miles, 8-inch line pipe northward from Crane county, Texas, for Texas-New Mexico Pipe Line Co.

Unstated, Silver Lake, Wash., water district; Macri Bros., Seattle, general contractor.

Wire

Wire Prices, Page 67

Pittsburgh—Small orders from a wide variety of sources, including everything but automotive buying, are holding wire markets at a constant level. All orders call for immediate deliveries. Slowness on the part of automotive interests would seem to indicate that combined inventories of auto builders and their suppliers are sufficient for the present.

Cleveland — Jobbers of wire and wire products continue to specify for fill-in requirements only as stock turnover remains at low levels of December. Distributors supplying the automotive trade report releases have shown practically no improvement. Mills remain closed in some departments while others are operating approximately 30 per cent. Mill prices are firm.

Chicago—Business in steel wire is slightly heavier. Consumption has increased moderately and sentiment has shown a similar gain. Average inventories of consumers are reported the lowest in years. New business is adjusted closely to immediate needs.

Boston—Improvement in wire buy-

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ing has been spotty, and, although diversified orders for prompt delivery are more numerous, the total volume of incoming business has not materially lifted finishing operations, except in a few departments. Included are electrical goods, with a small gain in manufacturers' wire demand. There is little advance buying. Wire rods are slow with consumer stocks still large in numerous instances. Prices are steady and unchanged.

Birmingham, Ala.—Wire products continue to show a gradual increase in demand, with indications of a general pickup in production before the end of first quarter.

New York—Wire orders are more numerous, with a moderate gain in volume, notably merchant products. Jobbers and dealers in some instances are filling in depleted stocks more actively. There has also been a mild improvement in manufacturers' wire. On the whole, however, buying has not gained materially. On 2800 kegs of common wire nails, procurement division, treasury department, New York, J. K. Larkin & Co., New York, bid 3.16c, delivered, a 2 per cent discount being allowed, also jobber allowance on 800-keg lots in the net bid which figures close to 2.50c, Pittsburgh. These nails will be furnished from stock and involve no mill purchase on the part of the distributor. About 140 tons are included in the award.

San Francisco—Demand for wire products is holding well for this season of the year. The imperial irrigation district, Imperial, Calif., will open bids Feb. 8 for 275 tons of aluminum or copper wire. The water and power department, Los Angeles, will take bids Jan. 13, under specification 2508, for 111 tons of AWG wire.

Rails, Cars

Track Material Prices, Page 67

Scattered buying of a few cars and locomotives represents the total of railroad activity. Western Maryland has withdrawn its inquiry for 1100 freight cars and a large rebuilding program of another eastern road is being held back. Paulista railroad, Brazil, has placed 345 cars with an American maker.

Tacoma Railway & Power Co., Tacoma, Wash., has placed 85 gasoline-powered buses with Twin Coach Co., Kent, O.

Car Orders Placed

Paulista Railway, Brazil, 125 gondola cars, and 125 flat cars and 95 underframes, to the Pullman-Standard Car Mfg. Corp., Chicago.

Interstate commerce commission, Washington, 156 fusion welded tank cars, to five builders.

Car Orders Pending

Alaska Railway, federal building, Seattle, one locomotive; bids Feb. 1.

Central of Brazil, 100 underframes for freight cars, pending.

Navy, one 100-ton and five 50-ton flat cars; bids Jan. 25.

Northern Pacific, 150 stock car underframes; bids asked.

Royal State Railways of Siam, a number of bogie wagons.

Western Maryland, 1100 freight cars; bids rejected.

Shapes

Structural Shape Prices, Page 66

New York—Structural steel buying is light with few tonnage projects placed. New work is coming out less actively, but includes 800 tons for west side elevated highway ramps, 133-136th street, New York, closing Jan. 18. Some private construction has been withdrawn temporarily and the bulk of estimates is for public work.

Boston—Structural contracts are estimated under 750 tons including a 300-ton pavilion, Stockbridge, Mass. Active inquiry, mostly small public work, is reduced by absence of bridge estimates. New tonnage being figured includes 725 tons for a state hospital building, Newington, Conn.

Philadelphia—With McCloskey & Co., this city, low on the general contract, district fabricators are manifesting special interest in the psychiatric hospital, Pittsburgh, requiring 2600 tons of shapes. Other new work being figured includes two state projects, involving a total of 385 tons. A hospital at Harrisburg involving 330 tons represents the largest district award to be re-

Shape Awards Compared

	Tons
Week ended Jan. 15	15,625
Week ended Jan. 8	16,687
Week ended Jan. 1	8,835
This week, 1937	29,346
Weekly average, 1937	23,281
Weekly average, 1938	13,716
Weekly average, December	13,591
Total to date, 1937	79,626
Total to date, 1938	41,147

Includes awards of 100 tons or more.

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ported. Shapes are unchanged at 2.46½c, delivered, Philadelphia.

Pittsburgh — No optimism is shown by most producers in this district. Most inquiries are on small projects. Of note during the week was the announcement that bids for dam number 24, the final structure in the canalization of the upper Mississippi, will be opened Feb. 3. The dam will be placed at Clarksville, Mo., and will require in excess of 7000 tons of fabricated steel.

Cleveland — Structural awards are limited to small tonnages for schools and other public projects. Industrial expansion or other private work have not appeared for some time although most fabricators are confident this situation will improve steadily through the remainder of the month.

Chicago — Inquiries include a bridge at Omaha, Neb., taking 3500 tons. Awards continue light, but early placing of 1332 tons for a bridge at Hennepin, Ill., is expected.

San Francisco—Awards of structural shapes aggregated 700 tons compared with 8826 tons for the first week in 1937. Consolidated Steel Corp. took 450 tons for an addition to the Santa Fe railway hospital, Los Angeles. Bulkheads for the naval base in Alameda, Calif., up for figures Jan. 26, will require 845 tons of sheet piling. The Brazos river conservation and reclamation district, Temple, Texas, will open bids Feb. 24 for the Possum Kingdom dam, calling for 12,500 tons of shapes and 4500 tons of reinforcing bars.

Seattle—Structurals continue to lead in activity. Projects pending exceed 2000 tons. Bids were opened Jan. 11 for 600 tons for the Seattle armory and awards are imminent for 600 tons of sheet piling for the Puget Island bridge substructure.

Shape Contracts Placed

2200 tons, farm show arena, general state authority, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

1650 tons, building, Brooklyn Central library, Brooklyn, to Bethlehem Fabricators Inc., New York; through Cauldwell-Wingate Co., New York.

1360 tons, municipal garage, Bronx, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; through Weiss & Weinsier Co., Brooklyn.

1165 tons, city hall, Houston, Tex., to Mosher Steel Co., Houston, Tex.

925 tons, curb angles, 66,000 linear feet, state procurement officer, treasury department, New York, to American Bridge Co., Pittsburgh.

750 tons, state highway bridges, Nos. 1, 2 and 3, Claverack, N. Y., to American Bridge Co., Pittsburgh.

700 tons, state highway bridges, Georgia, evenly divided between Virginia Bridge Co., Roanoke, Va., and Bethlehem Steel Co., Bethlehem, Pa.; A. Lyons, Rogersville, Tenn., general contractor.

500 tons, plant addition, Aluminum Co. of America, Mobile, Ala., to Virginia Bridge Co., Roanoke, Va.

500 tons, bridge, Bayville, New York, to Phoenix Bridge Co., Philadelphia; through Andrew Weston Co., Woodmere, New York.

500 tons, school and convent, St. Pascal parish, St. Albans, New York, to Lehigh Structural Steel Co., New York; through Hughes-Ahlers Inc., New York.

450 tons, bridge, Neuces river, LaSalle county, Texas, to Virginia Bridge & Iron Co., Roanoke, Va., through H. B. Zachary, Laredo, Tex.

450 tons, addition, Santa Fe Railroad hospital, Los Angeles, to Consolidated Steel Corp., Los Angeles.

415 tons, bridge FAP-715-E, Coryell county, Texas, to Mosher Steel Co., Houston, Tex.

385 tons, Woodrow Wilson junior high school, Port Arthur, Tex., to Orange Car & Steel Co., Orange, Tex.

360 tons, high school auditorium, Aberdeen, S. Dak., to Des Moines Steel Co., Des Moines, Iowa.

340 tons, research building, department of agriculture, Abington, Va., to the Fort Pitt Bridge Works, Pittsburgh.

330 tons, hospital, Harrisburg, Pa., through John McShain Inc., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

325 tons, building, Ellis hospital, Schenectady, N. Y., to Ingalls Iron Works Co., Birmingham, Ala.; through James Lowe & Sons, Schenectady, N. Y.

300 tons, repair shed, Missouri Pacific railroad, San Antonio, Tex., to Alamo Iron Works, San Antonio, Tex.

300 tons, pavilion, Berkshire Symphonic Festival Corp., Stockbridge, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

240 tons, high school, Niles Center, Ill., to Wendnagel & Co., Chicago.

200 tons, intake gates, Guntersville Dam, Ala., Tennessee Valley Authority project, schedule 110409, to Treadwell Construction Co., Midland, Pa.

200 tons, alterations to bridge over Missouri river, St. Charles, Mo., to Fort Pitt Bridge Works, Pittsburgh.

200 tons, state highway bridges, FAP-128-D, Perth Amboy, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

185 tons, Harris theater building, Mt. Lebanon, Pa., to Levinson Steel Co., Pittsburgh.

170 tons, state bridge, FAGS 38-1, Buffalo-Cheektowaga road, Erie county, New York, to American Bridge Co., Pittsburgh; Metzger Construction Co., Buffalo, general contractor; bids of Jan. 4, Albany.

170 tons, bridge, contract 1581, Indiana, to Fort Pitt Bridge Works, Pittsburgh.

135 tons, laundry building and tunnel, state hospital, Warren, Pa., to Erie Concrete & Steel Supply Co., Erie, Pa.

115 tons, gate frames, Guntersville Dam, Ala., Tennessee Valley Authority project, schedule 110409, to Milwaukee Bridge Co., Milwaukee.

105 tons, school, Northport, N. Y., to Weatherly Steel Co., New York; through John W. Ryan Co., New York.

Shape Contracts Pending

4500 tons, including 1500 tons of new piling, dam No. 24, Clarksville, Mo.;

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bids to United States engineers, St. Louis, Feb. 3.
3500 tons, Dodge street bridge, Omaha, Nebr.
2600 tons, Psychiatric hospital, Pittsburgh, McCloskey & Co., Philadelphia, low on general contract; 360 tons of reinforcing bars also will be required.
1832 tons, bridge, Hennepin, Ill.; Bethlehem Steel Co., Bethlehem, Pa., low.
1812 tons, sheet piling, United States engineer office, Los Angeles; bids in.
1750 tons, New York state building, world's fair, New York.
1250 tons, Possum Kingdom dam, Texas; bids Feb. 24.
845 tons, sheet piling, bulkheads for navy base, Alameda, Calif.; bids Jan. 26.
800 tons, ramps, west side elevated highway, 133-136th streets, New York; bids Jan. 18.
725 tons, state hospital building, Newington, Conn.
550 tons, seven-story state cancer hospital, Buffalo; bids Jan. 27.
550 tons, junior high school, Mt. Lebanon, Pa.
535 tons, Cicero avenue bridge across Sag channel, Cook county, Illinois; Wisconsin Bridge & Iron Co., Milwaukee, low.
450 tons, beam spans, FAS-203-H, Bernalillo, N. Mex.
407 tons, bridge, Gatesville, Tex.
400 tons, auditorium to high school, Aberdeen, S. Dak.
400 tons, building, Shrine of North American Martyrs, Auriesville, N. Y.
375 tons, four bridges, Duluth, Messabe & Northern railroad, Hibbing, Mont.
300 tons, state bridge, Hylebos creek, Tacoma, Wash.; bids expected in February.
250 tons, state orphans home, Scotland, Pa.; bids opened soon.
250 tons, livestock building, state fair grounds, Springfield, Ill.
240 tons, state bridge, over Clearwater river, Orofino, Idaho.
240 tons, state media building, Albany, N. Y.
150 tons, Englewood postoffice, Chicago.
140 tons, sheet piling and plates, United States engineer office, Los Angeles; bids opened.
100 tons, beam spans, FAP-180-E, Vaughn, N. Mex.
100 tons, including plates, 168-foot steel stern-wheel tug and tank barge; Commercial Iron Works, Portland, Oreg., general contractor.
Unstated tonnage, radial gate hoists, Burnt river project, Oregon; Foote Bros. Gear & Machinery Co., Portland, low.
Unstated tonnage, gate frames and penstock inlet gates, Coulee project; bids in to reclamation bureau, Denver.
Unstated tonnage, six radial gates and hoists for reclamation projects in Idaho and Wyoming; bids in at Denver.
Unstated tonnage, Idaho state bridges, Clearwater river and Jefferson counties; bids in at Boise, Jan. 14.
Unstated tonnage, Oregon state bridges, in Columbia and Linn counties; Mt. States Construction Co., Portland, and Tom Lillebo, Reedsport, low.

Reinforcing

Reinforcing Bar Prices, Page 67

New York—Prices failed to hold on 1455 tons, first quarter WPA reinforcing bar requirements, New York city boroughs, closing last week, concessions of $9 to $3 a ton being made by several distributors. Part of the tonnage, which includes new billet bars went at 2.40c, New York store houses, while 2.60c, delivered, was quoted on the remainder. Still another bidder quoted $3 a ton under the generally accepted market of 2.84c, New York, delivered job. On private work, most buying being in small lots, prices are more firmly held.

Boston—Not in months has there been such a dearth of inquiries involving 100 tons or more each. Buying is confined almost entirely to lots, 50 tons and under. State highway programs for bridges and other work are being planned, but few bids will be asked during the next few weeks.

Philadelphia—Outstanding award involves 400 tons for a state farm show arena, Harrisburg, placed with the Bethlehem Steel Co., while a leading inquiry involves 360 tons for the Psychiatric hospital in Pittsburgh, on which McCloskey & Co., Philadelphia, are low on the general contract. Demand otherwise is featureless, with bar prices holding somewhat steadier than a month ago, although still subject to test.

Pittsburgh—Most activity seems to center on foreign inquiries. Bids on government projects, previously submitted, have not yet been acted upon. Contemplated projects in most parts of the country are being postponed.

Cleveland — Tonnage of reinforcing bars and joists during December, for private projects in Northern Ohio on which estimates were requested totaled 173 and 174 tons, respectively. This compares with 300 tons of bars and 363 tons of joists during November. Estimated requirements from private sources for the full year 1937 were 5925 tons of bars and 1357 tons of joists. Outstanding bar tonnage of year was 1900 tons for the Industrial Rayon's plant at Painesville, O., while a substantial portion of the joist requirements were involved in a number of new schools built during that period.

Chicago—Concrete bar orders are light, the largest being 260 tons for a sewage treatment plant, Freeport, Ill. Heading new inquiries is 565 tons for a Mississippi river dam, Clarksville, Mo. Shipments against old orders are fairly steady but distributors and producers are unable to add to backlogs.

San Francisco—Awards during the first week of the year were far in excess of tonnage placed during 1937, due to a number of projects opened

Concrete Bars Compared

	Tons
Week ended Jan. 15	8,717
Week ended Jan. 8	10,059
Week ended Jan. 1	3,419
This week, 1937	4,316
Weekly average, 1937	6,266
Weekly average, 1938	7,398
Weekly average, December	4,111
Total to date, 1937	10,996
Total to date, 1938	22,195

Includes awards of 100 tons or more.

during December. Pending business aggregates less than 2300 tons. Awards so far total 7822 tons as compared with 502 tons for the corresponding period in 1937.

Seattle—Prospects are improving and rolling mills hope to have fair tonnages within 30 days. WPA projects are developing and involve sizable quantities of concrete bars.

Reinforcing Steel Awards

1900 tons, bureau of reclamation, Knob and Calexico, Calif., to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

1455 tons, first quarter requirements, WPA work, five boroughs, New York city, to W. Ames & Co., Jersey City, N. J., and The Wrought Iron Co., Lebanon, Pa.; bids Jan. 10, procurement division, treasury department, New York.

625 tons, bridge, Potomac river, Hancock, Md., to Igoe Bros., Newark; A. K. Wickstrom, Bound Brook, N. J., general contractor

400 tons, high school, Norton, Kans., to Sheffield Steel Corp., Kansas City, Mo.

400 tons, state farm show arena, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

385 tons, state bridges, Georgia, to Alabama Steel Co., Birmingham; A. Lyons, Rogersville, Tenn., general contractor.

312 tons, Woodrow Wilson junior high school, Port Arthur, Tex., to Sheffield Steel Corp., Kansas City, Mo.; A. F. Blair, Lake Charles, La., general contractor.

300 tons, post office and court house, Amarillo, Tex., to Texas Steel Co., Fort Worth, Tex.; Algernon Blair, Montgomery, Ala., general contractor. J. B. Klein Iron & Foundry Co., Oklahoma City, Okla., awarded structural steel.

300 tons, addition to state capitol, Phoenix, Ariz., to unnamed interest.

260 tons, sewage treatment plant, Freeport, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

260 tons, warehouse and wharf, Beaumont, Tex., to Southern States Steel Corp., Birmingham; A. J. Rife Construction Co., Dallas, Tex., general contractor.

200 tons, Seattle garage and miscellaneous school structures, to Bethlehem Steel Co., Seattle.

190 tons, power house, Lawrence, Kans., to Sheffield Steel Corp., Kansas City, Mo.

175 tons, bridge, Perth Amboy, N. J., to Joseph T. Ryerson & Son Inc., Chicago; through Franklin Contracting Co., Newark, N. J.

170 tons, bridge, Randolph county, Alabama, to Concrete Steel Co., Birmingham; Southern Construction Co., Birmingham, general contractor.

155 tons, highway work, Santa Clara county, California, to San Jose Steel Co., San Jose, Calif.

150 tons, bridge, Neuces river, LaSalle county, Texas, to Alamo Iron Works, San Antonio; through H. B. Zachary, Laredo, Tex.

150 tons, remodel Federal building, Phoenix, Ariz., to unnamed interest.

134 tons, highway work, in Chaffee county, Colorado, to unnamed interest.

127 tons, highway work, in Navajo and Yavapi county, Arizona, to unnamed interests.

120 tons, building, Peoples Power Co., Rock Island, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

105 tons, Edward Smith junior high school, Syracuse, N. Y., to Concrete Steel Co., New York.

104 tons, Whittier school, Berkeley, Calif., to Ceco Steel Products Corp., San Francisco.

100 tons, sanitary sewer and sewage disposal plant, Boyertown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, bars and shapes, Grant school, Topeka, Kans., to Ceco Steel Products Corp., Kansas City, Mo., and Topeka Foundry & Iron Works, Topeka; F. M. Sherman & Son, Topeka, general contractor.

100 tons, school, Winona, Minn., reinforcing and steel pan slab forms, to Ceco Steel Products Corp., Kansas City, Mo.; structurals to Winona Boiler Co., Winona; H. B. Kilstofte, Winona, general contractor.

100 tons, addition to high school, Needles, Calif., to unnamed interest.

100 tons, high school, Escondido, Calif., to unnamed interest.

100 tons, high schools, at Banning and Palm Springs, Calif., to unnamed interests.

Reinforcing Steel Pending

565 tons, Mississippi river dam No. 24, Clarksville, Mo.; bids to United States engineers, St. Louis, Feb. 3.

360 tons, Psychiatric hospital, Pittsburgh, McCloskey & Co., Philadelphia, low bidders; 2600 tons of shapes also will be required.

300 tons, procurement division treasury department, New York; bids in; this tonnage is in addition to 1455 tons bid Jan. 10.

300 tons, state custodial school, Buckley, Wash.; S. C. Erickson, Tacoma, general contractor.

228 tons, high school, Dinuba, Calif.; general contract to Richmond Construction Co., Fresno, Calif.

225 tons, New York state building, world's fair, New York.

150 tons, storm water sewer, Baltimore.

150 tons, high school, McPherson, Kans.

150 tons, hospital, Norton, Kans.

110 tons, seven-story cancer hospital, Buffalo; bids Jan. 27.

Unstated tonnage, school buildings, Wenatchee, Wash.; $250,000 available; bids Jan. 24.

Unstated tonnage, school structure, Olympia, Wash.; $165,000 available; bids Jan. 27.

Pig Iron

Pig Iron Prices, Page 68

Pittsburgh—First quarter business will continue at a snail's pace. No new inquiries of any size have appeared and no jump in business is expected before beginning of second quarter. Orders mostly are in about 100-ton lots with a few carloads.

Cleveland — Pig iron sellers experience a moderate increase in orders indicating that some foundries have increased production. Total shipments during January are expected to slightly exceed the actual figures for December. Stocks of most foundries are well below what was considered normal six months ago, but are still ample in

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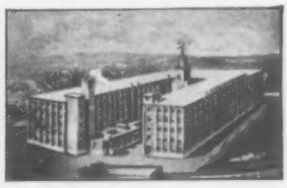

many instances for current requirements. Struthers Iron & Steel Co., Youngstown, O., banked a furnace last week. Prices are firm with some costs increasing while others are fixed.

Chicago—Pig iron shipments are gaining slowly as additional foundries resume operations. New business is light but some consumers have reduced stocks to the point where fresh buying will be necessary. In other instances the carryover of material bought last quarter will suffice during the present period. Some producers of automotive castings are more active while shipments to farm equipment manufacturers have been heavier lately. The market continues firm at $24, furnace for No. 2 foundries and malleable.

Boston—Car lot orders are more numerous and releases for shipments against old orders slightly heavier. While still below normal, current activity represents an encouraging improvement. Foundry melt has increased moderately. A large Providence, R. I., consumer has built up yard stocks materially during the last month part of this being imported iron. Foundry coke specifications are light.

Philadelphia — Sellers anticipate some improvement this month. There is no appreciable increase in the melt, but recent checking of stocks will undoubtedly reveal some gaps which consumers will wish to fill. Prices are unchanged.

New York—Better sentiment in pig iron is based primarily on slightly better specifications and prospects for further modest improvement now that inventory season is over. Business is of fill-in character and until there is an appreciable gain in foundry melt, specifications will be low. Export demand comprises relatively small scattered inquiries, with little actually being placed.

Washington—With exception of 223 tons of low phosphorus foundry iron for the navy, Norfolk, Va., delivery, contracts have been awarded on the 626 tons, bids on which opened Dec. 14. It was on this tonnage for Norfolk that price weakness developed, the low quotation being about $4 a ton under most other tenders. Requirements for the other yards were awarded by lot.

Republic Steel Corp. booked 200 tons for west coast yards. F. W. Marshall & Co., Philadelphia, took 104 tons, deliveries Boston, Philadelphia and Charleston, S. C. Sloss-Sheffield Steel & Iron Co. was awarded 54 tons, Boston and Philadelphia, and Hanna Furnace Corp., 45 tons, Washington.

Cincinnati — Fresh buying of pig iron, except in carload lots, has disappeared. Specifications against fourth quarter contracts, rewritten, are little improved over December rate, reflecting the disappointing foundry melt. Market dullness applies both to Northern and Southern iron. Prices continue firm.

Buffalo—Mild pickup in shipments, which marked the first week of the year, has abated. Producers report sales have receded to the slow pace prevalent in December.

Foundry operations, however, are above the previous month with some plants melting five days a week compared with two at the year-end. Inventories are being reduced but pig iron sales are limited to immediate requirements.

Some producers are forced to accumulate iron in order to maintain present operations. Seven out of 15 stacks are active.

St. Louis — With resumption on part schedule of several mills and foundries, closed during the holidays, shipments of pig iron show a slight upward trend. Sales are confined largely to small lots for prompt delivery and quantity buying is not expected before February. Farm implement manufacturers make the best showing as pig iron buyers.

Birmingham, Ala.—Twelve furnaces are blowing to supply a somewhat spotty and comparatively quiet pig iron market.

Toronto, Ont. — Improvement in Canadian iron and steel markets is having stimulating effect on merchant pig iron sales, which were more than 1000 tons for the week. Inquiries for first quarter delivery are appearing and already a number of melters have covered needs to the end of March. Local blast furnace representatives say booking will equal the last quarter of 1937. Spot sales are increasing, but melters still are taking stock and are holding supplies low until inventories have been completed. Daily melt is increasing following the holidays and now is around 65 per cent. Prices are firm and unchanged.

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Scrap

Scrap Prices, Page 70

Pittsburgh — General strengthening of the scrap list was evident following continuing activity in the export market. Railroad classifications were higher, prices following disposal of Pennsylvania scrap largely for export, it is believed. It was understood here the heavy melting went for better than $16, with specialties bringing upwards of $18.25. Prices remained largely nominal, however, with little activity. Some scattered carloads have been shipped.

Cleveland—Renewal of buyer interest in scrap is slow. While some local dealers bid on the list of the Pennsylvania railroad none was awarded here. It is believed most went east for export. Prices continue nominally unchanged. Buying is practically absent and shipments are light.

Chicago—Scrap continues dull and in the absence of mill buying, prices still are largely nominal. Offerings

are only moderate, with railroad lists small, but supplies are sufficient to accommodate the present light demand. Occasional small lots of No. 1 heavy melting steel are reported to have been sold at $13.50, leaving this grade unchanged at its recent range.

Boston—With scrap coming out less freely for export, prices for heavy melting steel display strength and better than $14, dock, for No. 1, is more prevalent, although on ordinary shipments that quotation holds. Domestic prices are also firmer, notably stove plate and cast grades. While buying has not gained materially, consumers show more interest. About 13,000 tons were loaded for export last week.

New York — Prices of steelmaking and foundry grades of scrap are unchanged but with a firmer undertone, despite lack of domestic business. Consumers are buying little and shipments against contracts are light. There is some activity in stove plate but dullness prevails for the most part. For the twelfth consecutive week $13.50 continues to be paid for No. 1 heavy melting steel for export, barge delivery. Material is coming out somewhat slower, due in part to less favorable weather for handling.

Philadelphia—A 50-cent advance in No. 2 melting steel, to $14, delivered, is noted among a few increases which have been made, principally in specialties. This increase in No. 2 steel is based on higher dealer offerings for material for delivery to an eastern Pennsylvania plant. Generally speaking, domestic buying is still slack, with most consumers having fairly good stocks on hand. In the case of one large consumer more hot metal from blast furnaces is being used, at the expense of scrap. The pressure for export scrap is easier, although $15 and $14 dock, are still being offered for No. 1 and No. 2 steel, respectively, after a little No. 1 had been picked up as high as $15.25, as an exception to the general market.

Baltimore—Approximately 25,000 tons of scrap, principally Baltimore & Ohio material, it is said, is being accumulated here for early shipment abroad, presumably for European destination.

Buffalo—With dealers in this area taking in scrap at the same values quoted here, indications are that local companies are not likely to accept present prices of leading consumers. For a while one of the leading buyers of the district had an offer in the market for 5000 tons of No. 1 material at $13.50 a ton. Dealers refused to consider the offer, which has been withdrawn. A few light sales of cast scrap have been reported with a fine grade of No. 1 machinery bringing $16 and cupola $14 a ton.

Detroit—Despite lighting of four open hearths this week by Great Lakes Steel Corp. here, the scrap market is dormant and prices are unchanged. Sale of a light tonnage of bundled sheets at somewhat over the current market was of a speculative nature, and quotations are holding at $10.25 to $10.75.

Cincinnati—Prices of iron and steel scrap are unchanged while the market shows no tendency toward expanding activity. Mills continue on light schedules and have scrap inventories adequate under such conditions. Dealer sentiment is stronger since the leveling off in quotations and are holding material on expectation of renewed consumer purchasing.

St. Louis — Buying of scrap is still absent and the market is dull and featureless. With the exception of a few items, in which there is a dealer short interest, prices remain nominally unchanged. Scrap rails and several large specialty grades were advanced fractionally. Offerings from all sources continue light.

Birmingham, Ala.—Scrap remains unusually quiet, with prices at the lowest point of several months.

Seattle—The credit situation in Japan gives signs of easing and exporting houses are hopeful they can soon forward scrap commitments delayed by import restrictions.

Toronto, Ont.—Trading in iron and steel scrap is spotty, with consumers interested only in special grades. Shipments of heavy melting steel and turnings again are being made to mills in the Hamilton district as dealers pick up sufficient material to make carloads. Local dealers are carrying only limited tonnages of heavy melting steel. Stove plate and machinery cast also have a fair market demand in Ontario, and Montreal dealers report surplus holdings with little resale demand.

Warehouse

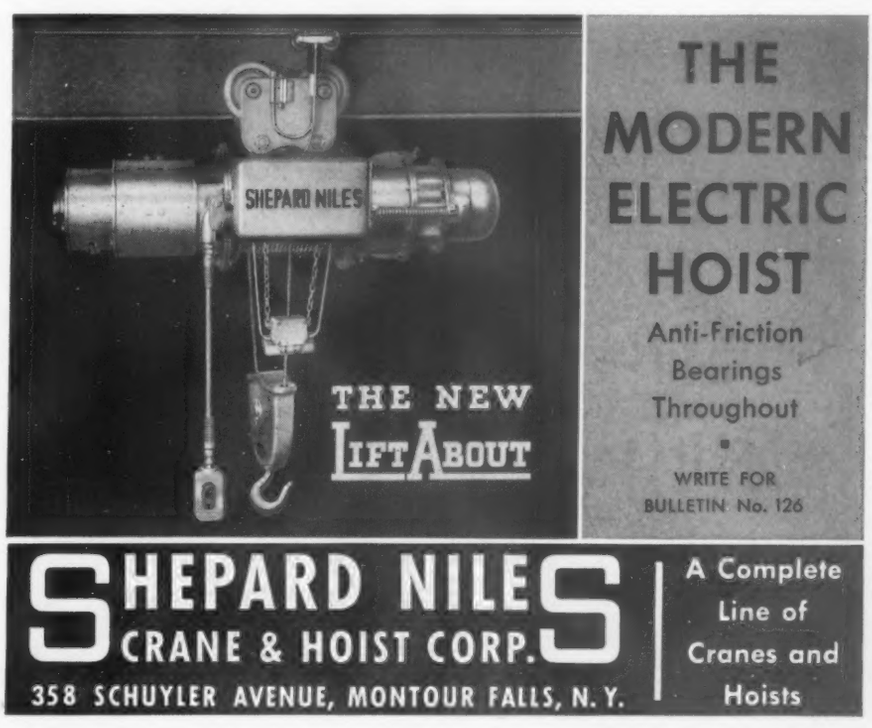
Warehouse Prices, Page 69

Cleveland — Sales and shipments out of warehouse continue unchanged at the low levels of the latter part of December and somewhat below the comparable period a month ago. Most distributors are still carrying excess stocks of some products, but in more than one instance have been forced to re-enter the market to balance out items that had become low.

Chicago — Sales are improving gradually, the upturn so far this month being in line with the usual seasonal trend. Further recovery is in prospect, reversing the trend prevailing during most of last quarter.

Buffalo—Although a slight pickup in miscellaneous orders is reported by warehouse distributors, the movement of merchandise is far from satisfactory. Buyers are restricting purchases to immediate needs. Some expansion in buying is hoped for around the end of the current month.

Philadelphia—Some increase in demand is noted by jobbers, who in the current recession have not experienced the dearth of demand wit-



nessed by the mills. This is usual under such conditions; in fact, variations in warehouse demand in good times as well as bad are not as great as demand from mills. Jobbers anticipate a modest increase over the next few weeks, probably reaching a peak for the present movement in March or April, when seasonal influences usually stimulate considerable business. Prices are unchanged.

Cincinnati — Warehouse sales have recovered from holiday dullness, attaining volume comparable to that of early December. Number of industrial orders is fairly well maintained, the individual specifications being light, close to early needs. Stocks of consumers are low. Prices are unchanged.

St. Louis — Distributors of iron and steel from store report average sales so far this month slightly above those of the like period in December, but measurably smaller than during the first two weeks of January, 1937. Commodities being purchased are chiefly for immediate use.

Seattle—January opened slowly, no improvement over December being noted. Some replacement items are moving but not in normal volume. No item out of stock is in special demand and mill buying is infrequent. Prices remain unchanged.

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Iron Ore

Iron Ore Prices, Page 70

Cleveland—Mary Charlotte iron ore mine, leased by the North Range Mining Co., Negaunee, Mich., will go into production on a limited scale Feb. 1. Since the first ton of ore was shipped in 1903 until its suspension at the end of 1928, this mine forwarded 4,789,000 tons.

Mining operations in the Iron River, Mich., district are being curtailed in some instances. The mines of M. A. Hanna Co., Cleveland, are operating on a four day schedule instead of five. The James mine, Pickands Mather & Co., Cleveland, an underground property, now is working three days a week. In the Marquete district, the Cleveland-Cliffs Iron Co. is also operating its mines on a 4-day weekly schedule. This condition is expected to continue through the winter.

Receipts of iron ore at lower lake ports for the season 1937, shipments to interior furnaces, and dock balances on Jan. 1, 1938 follow:

	Receipts	Shipments	Dock bal. Jan. 1, '38
Buffalo	5,851,276	720,850	137,817
Erie	2,745,395	2,516,672	286,287
Conneaut ..	9,635,048	8,952,505	1,960,744
Ashtabula..	6,572,771	5,562,246	1,764,115
Fairpor ...t	1,904,419	1,830,850	480,218
Cleveland..	10,082,766	7,300,583	792,615
Lorain	3,914,834	1,632,816	256,951
Huron	967,617	954,932	217,175
Toledo	1,923,960	1,171,167	62,951
Total	43,597,986	30,642,621	5,958,873
Year ago...	31,431,020	24,971,879	4,379,653

Ferroalloys

Ferroalloy Prices, Page 68

New York—Slow but steady expansion in shipments points to a better movement of ferromanganese than in December. This reflects somewhat better steel producing operations. Domestic spiegeleisen also is being released at slightly better rate. Prices are steady at $102.50, duty paid, Atlantic and Gulf ports, for ferromanganese, and $33, Palmerton, Pa., for 19 to 21 per cent spiegeleisen. The 26 to 28 per cent grade of spiegeleisen is also steady at $39, Palmerton.

Following recent minor changes, involving principally less than carlot shipments, other ferroalloys are unchanged. A slight improvement in steel is also reflected in these other materials, but demand is in no sense active.

Steel in Europe

Foreign Steel Prices, Page 69

London — (*By Cable*) — British blast furnaces in December broke all production records since 1918 with an output of 783,800 tons, compared with 762,300 tons in November. Active stacks at the end of the year were 133, compared with 135 at the end of November. Production of steel ingots remained at a high level, with 1,103,800 tons, 74,500 tons less than the 1,178,300 tons produced in November, the alltime high record.

Pig iron supplies now are adequate and some tonnage is available for export, especially hematite. Supplies of semifinished steel are also improving. Buying is in small volume as most consumers are well covered and mills are well booked in advance. The sheet market is dull.

The Continent reports slack markets and strong American competition in overseas markets, with price concessions.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 67

Sales and specifications have recovered only slightly and little sustained recovery is looked for until railroads resume equipment buying and freight car repair work on a more active schedule. Bolt, nut and rivet requirements of farm equipment manufacturers are relatively heavy though less active than a year ago.

Tin Plate

Tin Plate Prices, Page 66

Pittsburgh—Tin plate markets remain slow with prices firm. Importance of the forthcoming meeting of canners in Chicago on tin plate needs for the coming year gives both buyers and sellers a chance and an excuse to hold off

any pending activity until the tone of this important market for tin plate can be ascertained. Some demand for tin plate in the export markets has been noticed.

December Ore Imports At Baltimore Heavy

Baltimore — Arrivals of foreign iron ore here in December of 190,537 tons surpassed the November total of 133,325 tons, according to final compilation. This increase is attributed in part to the winding up of 1937 contracts. Due to this contract tonnage, arrivals at this port over recent weeks have not reflected the decline in ore consumption brought about by depressed conditions in the steel industry.

On the other hand, manganese ore arrivals of 79,602 in December fell off from the November total of 115,299. Chrome ore shipments also declined slightly in December, amounting to 18,259, as against 20,608 tons in the preceding month.

Iron ore arrivals at the close of last month comprised 11,200 tons from Cruz Grande, Chile, Dec. 25; 3000 tons from Whyalla, Australia, Dec. 28; and 2501 tons also from Whyalla, Dec. 29. Previous arrivals of iron ore in December were reported in the Dec. 27 issue, page 27.

Manganese ore arrivals, in addition to those also reported for December in the same issue, comprise 7800 tons from Poti, Russia, Dec. 29; and 8035 from Takoradi, Gold Coast, West Africa.

Chrome ore shipments, in addition to those also reported in the Dec. 27 issue for December, included 1972 tons from Beira, Portuguese East Africa, Dec. 23; 1421 tons, Lourenco Marquis, Portuguese East Africa, Dec. 23; and 978 tons also from this latter port, Dec. 30.

Pyrites shipments in December included 8748 tons, Dec. 4, 8099 tons, Dec. 16, and 8769 tons, Dec. 29, all from Huelva.

Philadelphia—Two shipments of chrome ore, involving 6104 tons, were received here during the week ended Jan. 8. One lot, involving 4704 tons came from South Africa, while the other, 1400 tons, came from Greece. Arrival of 201 tons of pig iron from British India also is noted.

Cold Finished

Cold Finished Prices, Page 67

Pittsburgh—Small lot buying for immediate delivery is the only sign of activity in cold-finished bars. Inventories generally are so low that jobbers are buying only on orders received, no apparent attempt being made to replenish stocks. Status of inventories among automotive producers is not generally known, but it is conceded that between producers and suppliers enough stock is on hand to run for a short time on slow production schedule.

Nonferrous Metals

Nonferrous Metal Prices, Page 68

New York—Following the buying spurt in nonferrous metals which lifted copper, lead, and tin prices substantially above year-end levels, quietness returned after last midweek. Sales here were stimulated earlier in the week by a desire of consumers to cover at least first quarter needs at the then prevailing levels and to replenish stocks as a protection against price advances.

Copper — Custom smelters raised prices ⅛-cent on Monday, ¼-cent on Tuesday, bringing electrolytic market to 10.87½c, Connecticut. Heavy demand for metal in London from consumers (including Russian and Japanese) and speculators resulted in a rapid price advance. This allowed exporters here to raise their bids for red metal scrap which smelters followed. Since buying here was not based on covering of fresh mill orders, the undertone weakened on the decline in the foreign market later in the week. At the close export copper was quoted 10.42½c against a close on Tuesday of 10.90c, c.i.f. Mine producers held prices firm at 11.00c, Connecticut.

Lead — Prices advanced $1 per ton to 4.90c, New York, on active demand early in the week. Sales tapered toward the close as prices eased abroad.

Zinc — Fresh demand was somewhat heavier in line with general metal market developments but prices held steady at 5.00c, East St. Louis, for prime western.

Tin — Straits spot advanced in a strong market to 43.00c on Wednesday, then eased to around 41.75c by the close. Consumers did not enter the market actively until Friday when they covered part of their anticipated needs at attractive levels.

Antimony — Spot held unchanged at 13.75c, New York, for American and 15.62½c, duty paid New York, for Chinese metal. Prices in London were much stronger during the week on Russian and Japanese purchases.

Cutler-Hammer Forms Canadian Company

■ Cutler-Hammer Inc., Milwaukee, announces Canadian Cutler-Hammer Ltd. has been organized to manufacture motor and generator control products for the Canadian market. This will be a subsidiary of the Amalgamated Electric Corp. Ltd., which will provide manufacturing facilities. Headquarters will be at 384 Pape avenue, Toronto 6.

Northern Electric Co. of Canada, for many years principal distributor for Cutler-Hammer in Canada, will be the distributor for the new company.

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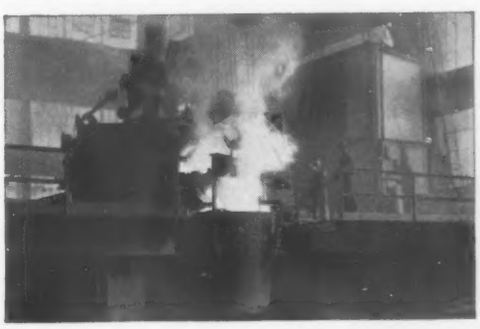

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U. S. Steel Explains Who Pays Wages

■ Distribution of its gross receipts from 1928 through 1936 is further explained by the United States Steel Corp. in the January issue of *US Steel News*.

In these years, "after paying expenses U. S. Steel paid out in wages and salaries 85 per cent of the monies that remained with it. But the record covers nine years, and some of them were very bad years—at one point operations dropped to 10 per cent of capacity.

"During the years 1932, 1933 and 1934, the wages and salaries paid exceeded the sum which was left over. The wages in those years were in part paid out of savings. . . ."

"It will be noted that in the best years, such as 1929, the wage earners received a smaller percentage of the income left over than they did in the years when U. S. Steel was running at a loss. But when the workers received everything and the owners got nothing, the pay envelopes were smaller than when the owners also got a fair share. The profitless years were not the high wage years. So there must be a catch in the notion that profits block wages.

"Wages cannot for long be paid at the expense of anyone. They can be—and have been—increased only by all producing more goods to share. Wages are paid by the public in the products it uses and the public uses the products only when they are of a satisfactory quality and at a price which it wishes to pay. The public pays the wages."

An earlier analysis (STEEL, Dec. 6, p. 27) explained the corporation's earned return to owners.

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Simplified Practice For Bolts Adopted

■ A simplified practice recommendation covering stock nominal sizes of machine, carriage and lag bolts has been presented to the industry for approval. Proposed by the American Institute of Bolt, Nut and Rivet Manufacturers, the recommendation lists marginal items leaning toward stock as well as stock items.

Sifting out of seldom-used sizes is expected to result in savings for both manufacturers and users. If the recommendations are approved by the industry, the simplified list will be promulgated by the national bureau of standards, department of commerce, Washington.

Westinghouse To Award Five New Fellowships

■ Five post-doctorate fellowships for research in modern physics during 1938-39 at the Westinghouse research laboratories, East Pittsburgh, Pa., will be awarded early in April to young scientific workers according to an announcement by the Westinghouse Electric & Mfg. Co.

Appointments are for one year and include eligibility for one reappointment. Five additional fellows will be appointed the following year under the plan, details of which have been mailed to universities and technical schools.

Problems of fundamental physics will be studied in one of the country's best-equipped industrial laboratories under the general supervision of Dr. E. U. Condon, associate director of the laboratory research program.

Revised Schedule for Exporters in Effect

A revised edition of schedule B, the statistical classification of domestic commodities exported from the United States, became effective Jan. 1. Customs officers have been instructed not to accept declarations which are not filled out on typewriter, in ink or with indelible pencil; unless all the required information is shown; declarations obviously in error; unless commodity details are in accord with the revised edition of schedule B. Copies of the revised schedules are available from the superintendent of documents, Washington, at 30 cents.

Private Enterprise Key To Prosperity

■ "Prosperity for all of us can come only through increased production, with an equitable sharing of that which is produced," said Charles R. Hook, president, American Rolling Mill Co., Middletown, O., in a recent statement.

"The extent to which the people of the United States will prosper in 1938, as well as in the years to come, will depend upon the extent to which individuals and groups of individuals are rewarded for their initiative, ability, thrift and effort. This means the protection and encouragement of private enterprise. Never in the history of the world has there been any sound prosperity on any other basis."

Equipment

Chicago—Machinery and equipment sales and inquiries are well sustained in the face of quiet activity in many metalworking fields. Demand for small tools has suffered more than sales of larger items, this resulting from the low rate of operations among many industrial plants. Manner in which inquiries for machine tools hold up is taken as indication of confidence the present business lull will be relatively brief. While many inquiries are small individually they are well diversified except for the continued lack of interest on the part of railroads.

Seattle—Market still is suffering from holiday lethargy and seasonal restrictions. Electric goods and pumping equipment lead, while some interest is shown in diesel marine engines. Road trucks and scrapers are in fair demand. Seattle has opened bids for 300 street car wheels.

Construction and Enterprise

Ohio

CLEVELAND — State Supply Co., 1237 East 123rd street, Cleveland, has been organized to job sheet metal supplies, furnace and roofing materials. Carl Kanner, president, W. S. Looney, treasurer. Company now operating.

CLEVELAND—Industrial Rayon Corp., West Ninety-eighth street and Walford avenue, Cleveland, plans installing motors and controls, conveyors, regulators, transformers and accessories and other equipment in new unit for producing cut staple rayon, to be located on site in vicinity of rayon mills at Painesville, O., or Covington, Va., site still to be determined. Work starts early in 1938. Cost over $1,500,000.

GAMBRINUS, O. — Timken Roller Bearing Co., 1835 Dueber avenue, Canton, O., plans constructing tube mill here in 1938. Cost over $500,000.

DAYTON, O.—Dayton Rubber Mfg. Co., West Riverview avenue, plans installing electric power and equipment in new one-story addition to automobile tire-manufacturing plant. Cost $60,000. Geyer & Neuffer, Ludlow Arcade building, Dayton, architects.

TOLEDO, O.—Toledo Edison Co. is arranging $1,900,000 fund for extensions and improvements in power plants and system in 1938, including extending transmission and distribution lines, power substations and other structures.

Michigan

HILLSDALE, MICH.—City plans constructing electric generating and power plant. Estimated cost $110,000. Hamilton & Weeber, Grand Rapids, engineers, are preparing the plans.

WAHJAMEGA, MICH.—State of Michigan will rebuild power plant at Michigan farm colony, Wahjamega. Estimated cost $365,000. E. R. Little Co., Detroit, engineer, will prepare plans.

WYANDOTTE, MICH.—Special election will be held Jan. 24 to vote on granting permission to Wayne county road commission to locate sewage disposal plant within city limits. Cost $300 000.

Illinois

CHICAGO — Sears, Roebuck & Co., West Arthington street, Chicago, plans central heating plant in three-story department store at Harford road and North avenue, Baltimore. Cost $1,000,000. Nimmons, Carn & Wright, 333 North Michigan avenue, Chicago, architects.

CHICAGO — Moody Bible Institute, 153 West Institute place, will install central heating plant in 12-story administration building at 812-928 La Salle street. Cost $500,000. Thielbar & Fiegard, 520 North Michigan avenue, architects.

CHICAGO—Coca-Cola Bottling Co. of Chicago Inc., 101 West Congress street, plans installing motors and controls, conveyors, electric hoists, loaders and other equipment in new three-story bottling plant at State and Seventy-third streets to develop rated capacity of 50,000 bottles per hour. Cost $200,000. Shaw, Naess & Murphy, 80 East Jackson boulevard, architects.

MOLINE, ILL. — City plans boiler and accessories, turbine-generator in power house used for municipal waterworks pumping station. Robert M. Benell, city engineer.

Indiana

GARY, IND.—City plans constructing sewage disposal plant. Cost $500,000. City council passed special ordinance ordering election.

INDIANAPOLIS—Faris Pump & Mfg. Co. has leased one-story building at 873 Massachusetts avenue for a period of years with option to purchase.

INDIANAPOLIS — American Foundry Co., Indianapolis, has been reorganized here with 2000 shares common stock and 4000 shares preferred at $100 par value.

New York

BROOKLYN, N. Y.—Pennsylvania Railroad Co., A. C. Watson, chief engineer, New York zone, Pennsylvania station, New York, plans traveling crane and loading facilities at 164 Kent avenue. Private plans.

CELERON, N. Y.—Board of village trustees plans constructing sewage disposal plant and sewer system. Special election will be held in near future to approve project and decide method of financing. Cost $110,000. W. S. Lozier Inc., 10 Gibbs street, Rochester, engineer.

CORONA, N. Y.—Interborough Rapid Transit Co., 165 Broadway, New York, has taken out permit for one-story substation addition to powerhouse at Roosevelt and 120th avenues, Corona, Long Island. Cost with equipment $75,000. Frederick W. Gardiner, company architect.

FALCONER, N. Y.—Village plans constructing sewage treatment plant and installing pumping equipment. WPA labor. Maturity spring. W. S. Lozier Inc., 10 Gibbs street, Rochester, engineer.

HUDSON, N. Y. — The V. & O. Press Co. Inc., machine shop, has been incorporated here with capital of $300,000. Jeffrey, Redmond, Eschar & Murray, 1 Wall street, New York.

MT. KISCO, N. Y.—Village plans constructing sewage treatment plant. State department of health, Albany, approved plans for maturity early this year. Cost $175,000.

TROY, N. Y.—City plans sewage disposal plant. Maturity indefinite. Cost over $100,000.

UTICA, N. Y.—City plans constructing municipal sewage disposal plant. Cost $750,000. J. B. Shaw, city hall, engineer. Owner plans to complete project before 1940 when permit to discharge sewage into Mohawk river expires. City engineer is commencing preliminary engineering work on the project.

Pennsylvania

NORRISTOWN, PA. — Fire damaged three shops of the Hilyard Casting Co. Dec. 25.

PHILADELPHIA — Ordnance department, Frankford arsenal, takes bids to Jan. 24, invitation 314-38-584, for 8000 feet 20-conductor rubber-insulated transmission cable, delivery Frankford arsenal.

UNIONTOWN, PA.—City has preliminary plans completed for disposal plant and five miles of sewers. Cost $600,000. Chester Engineers, Century building, Pittsburgh, engineers.

Connecticut

EAST HARTFORD, CONN. — Town, public works department, town hall, plans sewage treatment plant. Cost $25,000. Metcalf & Eddy, 1300 Statler building, Boston, engineers.

District of Columbia

WASHINGTON — General purchasing officer, Panama canal, will take bids to 10:30 a.m., Jan. 20, schedule 3321, for structural steel, fencing material, submersible motors, automatic telephone switchboard, and copper-nickel alloy bolts, delivery Cristobal or Balboa, Panama canal zone; until 10:30 a.m., Jan. 25, schedule 3320, for steel, steel billets, cast-iron car wheels, brake shoes, steel pipe, block-tin pipe, boiler tubes, lead-melting furnaces and pouring pots, twist drills, files, cold chisels, resistors, delivery Cristobal or Balboa, Panama canal zone; until 10:30 a.m., Jan. 27, for various amounts of cast-iron pipe, track bolts, wire rope, delivery Cristobal or Balboa, Panama canal zone.

WASHINGTON — Navy department, bureau of supplies and accounts, takes bids to 10 a.m., Jan. 21, schedule 2522, for wood-turning, motor-driven lathe, delivery San Pedro, Calif.; schedule 2525, for motor-driven milling machine, delivery San Pedro, Calif.; schedule 2526, for portable wood shaper, delivery San Diego, Calif.; schedule 2527, for motor-driven band saw, delivery San Diego, Calif.; schedule 2529, for two

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motor-driven hydraulic-drive table surface grinder machines, delivery Alexandria, Va.; schedule 2548, for motor-driven oxyacetylene gas cutting machine, delivery Brooklyn, N. Y.; schedule 2549, for 105 outlet arc-welding panels with reactors, delivery Brooklyn, N. Y.; until 10 a.m., Jan 25, schedule 2575, for flood lights and power plants, delivery Quantico, Va., and San Diego, Calif.; schedule 2569, for rough cast-iron castings, delivery Brooklyn, N. Y.; schedule 2511, for compound boiler, delivery various east and west coast points; schedule 2514, for galvanized iron buckets, delivery various east and west coast points; schedule 2554, for copper-nickel alloy forgings, delivery Washington.

Florida

NEW SMYRNA BEACH, FLA. — City plans making extensions to municipal light plant. Cost $75,000.

Wisconsin

APPLETON, WIS. — George Walter Brewing Co. will build additional bottling house unit.

RACINE, WIS.—J. I. Case Co. plans installing motors and controls, conveyors, electric hoists and other equipment in new addition to local plant for expansion in motor-tractor works. Cost $100,000.

SUPERIOR, WIS. — Great Northern railway is preparing estimates for general service building at ore docks in Allouez, suburb of Superior, and new coaling station at main roundhouse here.

Minnesota

COSMOS, MINN. — Village, H. Zurst, city clerk, will take bids soon on materials for constructing steel tower and tank, cast-iron water mains and pumping station. Cost about $27,000. Ealy G. Briggs, 1957 University place, St. Paul, engineer.

GOODHUE, MINN. — Village, C. W. Wolfe, clerk, plans purchasing pump for water supply system.

Texas

BEAUMONT, TEX.—Texas Spring & Wheel Co. has been incorporated here. T. N. Tortoris, J. T. Tortoris, 1298 Crockett street, incorporators.

ELECTRA, TEX. — City, A. B. Corder, mayor, soon starts work on proposed light plant. Cost $220,000.

FRISCO, TEX.—Denton County Electric Co-operative, J. T. Whiteside, obtaining rights of way for constructing Collins county extension. Work begins at once.

HOUSTON, TEX.—City, J. M. Nagle, director of public works, will probably call for bids Jan. 19 for new lighting system for municipal airport. Cost $50,000.

LUFKIN, TEX. — Southland Paper Mills Inc., care of E. L. Jurth, president, Angelina Lumber Co., Lufkin, company official, plans installing motors and controls, transformers and accessories, conveyors, regulators, electric hoists, loaders and other equipment in new pulp and paper mill for newsprint production on site in vicinity of Lufkin. Includes powerhouse. Estimated cost $5,000,000. Company has RFC loan of $3,400,000 and present stock subscriptions total $1,600,000. Work to begin early in 1938. Wirt Davis, chairman, board of directors, Republic National Bank building, Dallas, Tex., is one of the company heads. Mill plans prepared by George F. Hardy, 305 Broadway, New York, consulting engineer.

Kansas

STAFFORD, KANS. — Recommendations have been made by Paulette & Wilson, 1006 Kansas avenue, Topeka, consulting engineers, to city council on improvements to power plant and waterworks, including 450-horsepower diesel engine.

North Dakota

ASHLEY, N. DAK. — Petitions have been filed with city council asking for election on bond issue to finance construction of 50,000-gallon elevated water storage tank, distribution system and water supply system. Cost $75,000. J. D. Stabler, city auditor.

FORMAN, N. DAK. — Town clerk, O. H. Kastner, takes bids to 8 p.m., Jan. 25, for constructing waterworks system and elevated tank and tower, including pump house, 50-gallon-per-minute turbine pump and motor, heater house and 50,000-gallon elevated tank. Dakota Engineering & Construction Co., Valley City, consulting engineer. Estimated cost $53,000.

South Dakota

FREEMAN, S. DAK.—City has rejected recent bids for municipal electric power plant and distribution system. Will ask for new bids at early date. Cost $100,000. Buell & Winter Engineering Co., Insurance Exchange building, Sioux City, Iowa, consulting engineer.

Iowa

IOWA CITY, IOWA—Iowa City Power & Light Co., Iowa City, plans extensions in transmission lines in section of Johnson county. Application has been made for permission.

PARKERSBURG, IOWA — City, care of city clerk, is contemplating improving waterworks, including new wells and purifying plant. Plans not complete.

Nebraska

LINCOLN, NEBR. — Nebraska state railway commission has granted permission to the Iowa-Nebraska Light & Power Co. to construct approximately seven miles of transmission lines in Cass, Butler and Nance counties.

LINCOLN, NEBR. — Eastern Nebraska Public Power District, Dr. A. P. Fitzsimmons, president, has filed application with state railway commission for permission to construct 65 miles of rural transmission lines in Otoe county and 28½ miles in Johnson and Pawnee counties. George W. Kline, 522 First National Bank building, Lincoln, district secretary. H. H. Hennington, Engineering Co., 326 Union State Bank building, Omaha, consulting engineer.

OMAHA, NEBR. — Capt. Herbert B. Loper, district engineer, U. S. corps of engineers, 1424 City National Bank building, Omaha, takes bids to 2 p.m., Jan. 26, for furnishing and delivering f.o.b. contractor's plant, complete for operation, one full diesel engine not less than 320 brake horsepower at not more than 350 revolutions per minute. Maximum weight, excluding flywheel, not to exceed 39,500 pounds. Specifications obtainable from engineer.

OMAHA, NEBR. — Capt. Herbert B. Loper, district engineer, U. S. corps of engineers, 1424 City National Bank building, Omaha, is taking bids to 2 p.m., Jan. 25, for one diesel electric-generating set consisting of one 100-kilowatt direct current generator and one full diesel engine of not less than 160 brake horsepower at 700 revolutions per minute complete with accessories. Shipment on government bill of lading to Omaha. Specifications obtainable from engineer.

SUPERIOR, NEBR. — Nebraska state railway commission has granted permission to southern Nebraska Power Co., Superior, to construct transmission line from Lawrence to St. Stephens church.

Colorado

DENVER — Denver, Rio Grande & Western Railroad Co. has approved plans for addition to steam power house at Pueblo terminal, including boiler units and auxiliaries. Cost $40,000.

DENVER — Bureau of reclamation, Denver, plans motor-driven pumping plant for Glendive unit of Buffalo Rapids irrigation project, Montana. Cost about $400,000.

Idaho

COEUR D'ALENE, IDAHO — Kootenai County Rural District has accepted $100,000 REA grant to finance constructing 100 miles of power line. Second unit of project involves similar contract.

Pacific Coast

FRESNO, CALIF. — Additional funds will be spent for relocation and constructing 1000 and 2000-volt lines connected with San Joaquin Light & Power Corp. new substation now under construction on G street. Cost $42,600. Separate building to house control equipment.

LOS ANGELES, CALIF. — International Harvester Co. has purchased agricultural implement plant of Dyrr Mfg. Co., Huntington Park, Los Angeles, and will convert plant and facilities into the company's Pacific coast headquarters.

SAN FRANCISCO — City and county commissioners of San Francisco plan central heating plant in multi-story hospital at Lagunda Honda home. Cost $700,000. Dodge A. Riedy, 821 Market street and Frederick H. Meyer, Kohl building, San Francisco, architects.

ELLENSBURG, WASH. — City has applied for WPA allotment to aid in constructing sewage disposal plant.

EVERETT, WASH. — Lowell water district has adopted plans for proposed water distribution system and fire protection equipment. Specifications include 30,000 feet 2 to 6-inch steel or cast iron, 48 hydrants, 60,000-gallon elevated steel storage tank. Parker & Hill, Seattle, engineers.

SEATTLE — Allied Steel & Engineering Corp., 816 Alaska street, has been capitalized at $100,000 here by Edward E. Stewart, L. E. Paget, F. J. Eitel, and W. N. Lauderkin.

SUNNYDALE, WASH. — Pacific Telephone & Telegraph Co. plans early construction of steel and brick central exchange with modern equipment.

Canada

COPPER CLIFF, ONT.—International Nickel Co., D. McCaskill, manager, plans low grade mill unit adjoining present concentrator. Private plans. Cost including equipment $1,500,000.

MEGANTIC, QUE.—Municipality plans constructing water pumping plant. Cost $30,000. C. Ricardi, town hall, engineer.

TISDALE, SASK.—Saskatchewan power commission, L. S. Thornton, chairman, plans extending power lines 26 miles to Arborfield and Aylesham from Tisdale with distribution systems in each town. Cost $80,000.